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Where Track Renewals Are Imminent---



--Consider "*Union*" Centralized Traffic Control

When major track renewals are imminent on double track lines, it is well to ask the question "Can we operate efficiently with fewer main tracks?" An affirmative answer will frequently result if the possibilities of C.T.C. as a means of increasing the *capacity per track* are considered.

When double track is changed to single track with C.T.C. operation, the most effective siding arrangement can be made.

The resultant modern single track will be found to be more efficient than the existing double track arrangement.

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RAILWAY AGE

Big Business Socialists Versus Private Enterprise

For the first time in history it is plain to everybody, or should be, that the entire system of private enterprise in this country is seriously threatened with destruction. It is thus threatened because it is being attacked by powerful forces and being really defended by hardly anybody. In literature emanating from large business organizations it is represented that private enterprise is being attacked by New Dealers and defended by anti-New Dealers. It is not as simple as that; for private enterprise is being attacked and endangered not only by New Dealers but also by anti-New Dealers who either don't know what private enterprise and the policies necessary to maintain it are, or are selfish hypocrites.

A Steel Manufacturer and "Private Enterprise"

A certain steel manufacturer is chairman of the propaganda committee of a large national business association. While in the midst of soliciting funds for this committee, he recently issued a statement condemning certain other steel manufacturers for reducing prices. He declared there was no need of government interference or reduction of wages if the manufacturers would act sensibly and base their prices on costs. He thus declared against competitive price-fixing in his industry. But all economists favoring private enterprise agree that, in the long run, public sentiment should and will compel the prices of private enterprise to be regulated either by competition or government.

In addition, this manufacturer takes advantage of government waterway subsidies by shipping his products via a barge line owned by his company while charging his customers the same prices as if he shipped by rail. If he really believed that prices should be based on costs he would either (1) favor requiring the users of waterways to pay tolls for their use or (2) include in his prices only the costs of water transportation actually borne by his company. But, no. By condemning price-fixing by competition, he invites government regulation and even government ownership of his industry. At the same time he takes advantage of socialistic subsidization of water transportation to get his transportation at less than cost in competition with the private enterprise of railroad transportation which must base its rates on its total costs. He thus simultaneously attacks real private enterprise in two different ways—

and then asks everybody to join him in helping save private enterprise!

Ignorant Inconsistency—or Plain Dishonesty?

Is that ignorant inconsistency—or just plain dishonesty? Anyway, all over this country there are business men who are showing inconsistency—or dishonesty—in similar ways. Senate bill 2009 provides for some regulation of carriers on inland waterways. There has been formed in the House a "bloc" to defeat this provision. It represents a small group of shippers who are transporting their freight by water at a low cost to themselves as a result of subsidies granted by the government while basing their selling prices on rail rates. No doubt all these shippers pretend to support the National Association of Manufacturers or the Chamber of Commerce of the United States or both in defending private enterprise. But what they are actually showing is that they favor just as much private enterprise and just as much socialism as they believe will benefit them regardless of the effects on everybody else—and on private enterprise.

The attitude of all the business interests that oppose putting railway and highway transportation on the same basis as respects regulation and subsidies is precisely similar. All these professed defenders of private enterprise know that what they are doing is driving the railroads toward government ownership. Men who thus profess to favor private enterprise, and at the same time practice, defend and promote policies incompatible with it, are either dishonest or know so little about economics that their views are entitled to no more consideration than those of hair-brained radicals.

"Private Enterprisers" and President Roosevelt's Plan

President Roosevelt recently has sent to Congress a plan for about 4 billion dollars of new spending-and-lending on "self-liquidating" projects. It includes government purchase of 500 million dollars' worth of equipment intended to be leased or sold to the railroads. The *Railway Age* is so strongly in favor of private enterprise that it cannot honestly support any such government program, although part of it apparently might be temporarily advantageous to this paper and its customers. But those defending and promoting present gov-

ernment transportation policies cannot consistently oppose the President's program; and probably most of them will covertly or openly support the parts of it they believe will temporarily benefit their industries—and thus further stultify themselves as pretended defenders of private enterprise.

One of our railroad friends says that recently in these pages we have been "calling a spade a ——— shovel." He is right. The behavior of people must be judged from an ethical standpoint by taking into account, not only what they do, but who the people are and the circumstances surrounding their behavior.

When a New Dealer or socialist plumps for government competition with private enterprise, we believe their behavior to be evil because the end they are driving at is bad, but concede their honesty because their means is consistent with their objective. But when the Chamber of Commerce of the United States lends its support to *essentially the same means toward a socialistic goal* by maintaining silence regarding present socialistic transportation policies we consider its behavior much lower in the moral scale. Such behavior by the Chamber is not only ethically indefensible—it is just plain screwy to boot. What may be a spade in the hands of socialists thus becomes a ——— shovel when wielded by self-styled defenders of "free private enterprise."

Radicals Fairer Than U. S. Chamber

Never has the outlook for free private enterprise been so dark. And the fault lies primarily with its alleged defenders. As some philosopher has said, truth may emerge from error, but not from confusion. A few months ago it looked as if the friends of private enterprise had the New Deal on the run. But what has happened? Well, when the Townsend humbug came to a vote in the House it got a larger share of Republican than of Democratic votes. There was similar Republican support for the recent political hand-out to agriculture. The principal fighters for the unconscionable waterway project on the Connecticut river between Hartford and Holyoke are a couple of prominent Republican politicians. The main apparent difference is that the New Dealers want to rob the taxpayers to give handouts to people who really need alms, while the Republicans and certain business interests want to rob the taxpayers to give handouts to people who don't need them.

The depth of business's official lack of principle was never better shown up than in the pronouncement of the United States Chamber of Commerce with regard to transportation when compared with the statements of some radical politicians on the subject. Just compare them!

STATEMENT OF THE CHAMBER OF COMMERCE OF THE U. S.

This annual meeting has before it the recommendations of the Transportation Confer-

STATEMENTS OF SENATORS WHEELER AND NORRIS

Senator Wheeler: We have taken a billion and a half dollars out of the Treasury of

ence of 1938-39 for railroad legislation, arrived at after extended study by representatives of all principal business interests. The objectives include preservation of private ownership and operation; strengthening of carrier credit; avoidance of political rate-making, removal of obstacles to voluntary railroad consolidations and abandonments; authorization of compositions between railroads and their stockholders and creditors; concessions in federal tax provisions to promote improvements, consolidations, operating economies and financial adjustments; and relief from certain unfair burdens and restrictions.

We approve the proposed measures as a limited program appropriate for immediate enactment. Additional measures of remedial railroad legislation, and the necessary factual information on which to base them, should be the subject of thorough investigation with full opportunity for all interests to be heard.

the United States to be used to widen and deepen those river channels. Who has paid the taxes to provide that money? All the people of the United States, including the railroads of the country, have paid those taxes. They have helped to pay for the widening and deepening of those channels with their own money. In view of the fact that the Government furnishes the water carriers with the means to carry on their transportation, they should at least submit to having their rates regulated upon a fair basis with their competitors. I challenge anyone to say that that is not fair and just.

Senator Norris: Conscientiously, I cannot defend a refusal to regulate transportation on the rivers so long as I insist on the regulation of transportation that competes with them, even though my prejudice might be all the other way because of the experience we have gone through in the recent past.

The Elephant and the Bourbons

The Chamber of Commerce adopts its meaningless resolution on the subject of transportation when every informed person in the country is aware that every known principle required for the preservation of free private enterprise is being violated in connection with the railroads, and when it is equally well known that the primary beneficiaries of this violation are big industrial concerns who ship their goods by waterway or highway or which supply the machines, the roadways and the fuel for commercial highway transport. So real private enterprise has no effective defenders in the dominant leadership of the Chamber of Commerce.

The American people since last year's "recession" had been increasingly withdrawing their support from the New Deal. The opportunity afforded the Republicans and conservative business leadership was a golden one. And what have they done with it? The Republicans have tried to outspend the New Dealers; and the official spokesmen for business have shown about as much respect for the principles of private enterprise as Comrade Earl Browder. It has been said that the elephant never forgets anything and that the Bourbons never learn anything—sayings very apropos now regarding the G. O. P. and the Babbitts of business.

Business Needs New Leadership

There are plenty of business men, both big and little, in this country who *do* hold to sound economic and ethical principles—and are just as zealous in conceding these principles to other people as they are in demanding

them for their own protection. With a little extra effort they might dethrone the opportunistic self-seekers from their seats of power in ostensible spokesmanship for all business. How can they be awakened to a fuller appreciation of the inestimable harm which the inconsistent or dishonest few who now dominate the spokesmanship for business are doing to the prestige of all business and to the hopes for recovery from this long depression?

There will not be any recovery under the capitalist system in this country until the system of free private enterprise is given a chance to operate without oppressive government competition. The system of free private enterprise in transportation has been largely destroyed, both by avowed enemies of private enterprise and by its alleged friends who dominate the policies of large industrial enterprises and organizations. There rests no more vital responsibility on the shoulders of conscientious and intelligent business men than that of converting or supplanting the present intellectually dishonest business spokesmanship.

Mechanical Division Research Projects

To one who is still skeptical as to the quality and quantity of the engineering investigation and research which is being devoted to the development of railway motive power and rolling stock, attendance at the sessions of the annual meeting of the Mechanical Division, Association of American Railroads, reported elsewhere in this issue, would have had a decidedly clarifying effect. References to programs of intensive investigation and research were constantly recurring as the 13 standing committees made their reports. All of this is clear evidence of the conscious interest the railroads are taking in pushing and guiding the developments into channels where changing conditions are creating a great need.

It has frequently been pointed out that the railroads are users of goods and not producers of goods. The materials and equipment which they buy are the product of other industries, and, to a large extent, improvements and progress in the development of these things are a responsibility—and a business necessity—of the producing industries. Throughout railway history this more or less competitive urge of the producer has been effective and the railways have utilized progress in metallurgy, in processes, in invention and in engineering refinements of design from many sources.

It is doubtful whether they will ever be able to, or should, exercise complete control over progress in the development of the things which they buy, unless and until they assume complete responsibility for their production and distribution. Since 1933, however, when the Mechanical Division first appointed a research committee of the General Committee to survey proposals and make recommendations with respect to the pro-

grams required for constructive study of important problems, there has been a steady increase in the conscious effort of the Mechanical Division to stimulate and guide developments in motive power and rolling stock. The urgent need for improvements and changes created by the competition of rival transportation agencies has, no doubt, had some part in this result. This has not supplanted the manufacturers as research agencies, but it has co-ordinated their work and brought that of groups of manufacturers into focus.

One of the important projects, undertaken by the division this year and discussed at the annual meeting, is the testing in road service of different types of freight car trucks to determine their relative adaptabilities for the high operating speeds which must be maintained if railroads are to enjoy any real measure of success in meeting fast competitive schedules. The A. A. R. has authorized the expenditure of \$45,000 for this work, and the Pennsylvania and 10 private car truck manufacturers are contributing in a substantial way by supplying test trucks, exclusive of wheels, axles, journal bearings and other details which the A. A. R. will provide in order to control and minimize the effect of these variables on truck performance. The tests will be made with a 5-car test train between Altoona, Pa., and Lock Haven on the Pennsylvania.

Judging by the care with which all details of the program of tests have been developed and the effort made to minimize delay, avoid unnecessary labor and cost in the test procedure and secure accurate, comparative results on a strictly impartial basis, there is every indication that these tests will prove a highly constructive research activity resulting in substantial benefits not only to the truck manufacturers themselves, but to the railroads in general.

One cannot read through the Wheel Committee's report without being impressed by the fact that this group of men is thoroughly alive to the unusual importance of the design, manufacturing processes and railway shop practices involved in the whole question of car and locomotive wheels under present-day high-speed operation. The stepping-up of train speeds into the zone between 60 and 100 or more miles an hour has, of course, brought to light many problems that were of no great consequence at lower speeds. Few of these demand more attention than wheels.

To those who are close to this subject it is rapidly becoming evident that not the least of the difficulties is the fact that the railroads have not made as rapid progress in the equipment and practices of their wheel shops as they have in many other respects. Recognition of this is to be seen in several places in the Wheel Committee's report and it is a rather startling statement that is made in that section of the report dealing with wheel shop practices to the effect that only 44 per cent of 61 shops involved in an investigation of such practices were rated as carrying on their work in conformity with the standards prescribed in the Wheel and Axle Manual. Elsewhere in the report, in

dealing with the removal of wheels which show oil seepage, the committee said, "There is only one way to eliminate the removal of wheels on account of oil seepage and that is by better wheel shop work."

There may have been a day, at some time in the past, when it didn't make much difference if wheels were bored a little off center, or mounted or turned improperly, but such things take on a vastly greater significance at 60 to 100 m. p. h. If the roads will follow the Wheel Committee's recommendations a part, at least, of the wheel problem will be simplified.

Then there is the work of the Committee on the Further Development of the Reciprocating Steam Lo-

comotive. Here the Mechanical Division is exercising its co-ordinating and directing function and utilizing the specialized knowledge of all of the steam locomotive builders. The progress so far made promises a marked stimulation in steam locomotive development even though a complete design of a locomotive for a specific purpose were never completed by the committee itself.

These and other projects now under way are all outstanding examples of intensive engineering study and, as Chairman Hankins implied in his address, they are all producing results and producing them with remarkable speed, considering the conditions.

What Will the Traffic Bear?—20

"Differential pricing" (that is charging one set of customers more than another set for a similar service) is justifiable—and can be made to "stick"—only under conditions of absolute monopoly.

An electric utility usually has a so-called monopoly of its territory, but its *actual* monopoly only begins at the point where the cheapest possible private production of power leaves off. That is, the utility's monopoly extends downward from ten cents or so per kilowatt-hour. Below that price,

of the latter to revise to meet current conditions. Moreover, utilities' pricing is designed to encourage volume, with the result that kilowatt-hours consumption has increased 30 per cent within the past decade, while railroad tons originated have declined 25 per cent. The kilowatt-hour consumption index was 11 per cent greater in May, 1939, than in May, 1938. **Railway merchandise loadings in May this year were only 2.4 per cent above last year, but truck loadings were 32.7 per cent higher.**

In other words, the ability of a so-called "monopoly" to maintain price differentials has a definite limit, which is fixed by the current cost to the consumer of a substitute service. Before the coming of the truck the "ceiling" under which the railroads were able to practice price differentiation was a very high one. It was set by horse-and-wagon transportation (20 cents per ton-mile or more) and by the willingness of the consumer to accept an inferior substitute rather than pay too dearly for railroad service.

Railroad monopoly power has not disappeared. All that has happened is that its "ceiling" has been reduced from about 20 cents per ton mile to about 2½ cents per ton mile (except where waterway competition is a factor). Beneath that "ceiling" the railroads may still economically practice price differentiation to the extent that it is profitable (and approved by the regulatory authorities) the same as the electric utility does.

What the railroads need today is another MacGraham. The railroads had their competitive difficulties back in the 'Seventies but the ingenious MacGraham sized up the situation realistically and developed a rate-making formula to meet it. If he had not done so, there would today be no such vast industrial empire as exists in the inland section of Official territory.

What would a MacGraham do today? Certainly the first thing which would fall afoul his critical gaze would be the classification of freight. That is the principal offender which is depriving the railroads of traffic.

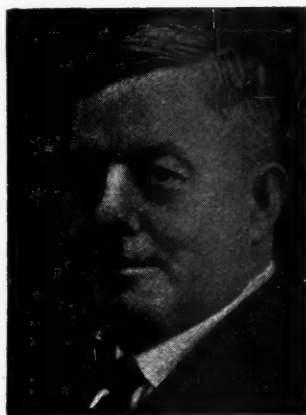
The controlling principles today are the same as they were in the '70's. They only need be adjusted to meet today's conditions. Paraphrasing John Sherman when he was considering plans to resume payment in specie after the Civil War—the way to revise is to revise.



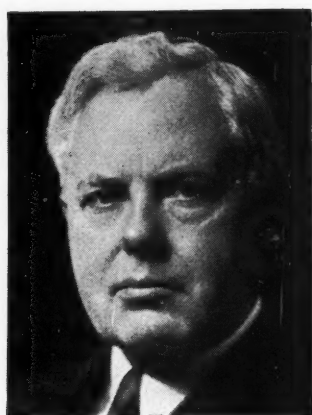
for domestic lighting current, it has a wide latitude for differentiation. For cooking purposes its "ceiling" is much lower than for lighting, and it dare not go above the ceiling because customers will resort to other utilities. For heavy industrial use, the utility's "ceiling of monopoly" is still lower. Here, too, the rate charged is dependent upon the volume used and is limited by the cost of private production and substitute service. Electric utility rates are primarily based upon the cost of producing the service to a given consumer, but also take into account the cost of substitute service and are so made as to induce greater volume. They are constantly being changed to meet current conditions.

The fundamental difference between the utilities' and the railroads' pricing structures is the failure

Mechanical Division Holds Three-Session Meeting at New York



F. W. Hankins, Chairman



W. H. Flynn, Vice-Chairman

Reports of thirteen standing committees presented—Division aggressively pushing development of high-speed and high-capacity motive power and freight-car trucks for higher-speed service

FOR the first time since 1905 a meeting of the chief mechanical department officers of American railroads was held at New York when the Mechanical Division, Association of American Railroads, held its seventeenth annual meeting at the Commodore Hotel, June 28, 29 and 30. Sessions were called to order each morning at 9 o'clock and adjourned at 1 p. m. to give the members opportunity to inspect the transportation exhibits at the New York World's Fair during the afternoon and evening.

The first session, which was attended by about 300, was addressed by the chairman of the division, F. W. Hankins, chief of motive power, Pennsylvania, and by S. O. Dunn, chairman of the board, Simmons-Boardman Publishing Corporation, and editor, *Railway Age*.

Other speakers were W. J. Patterson, director, Bureau of Safety, Interstate Commerce Commission, and J. B. Brown, assistant chief, Bureau of Locomotive Inspection, Interstate Commerce Commission. Mr. Patterson in speaking of high-speed passenger-train operation, questioned the necessity of operating at speeds of 100 or more miles an hour in order to maintain schedules, asserting that many railroads with the highest average speeds have the lowest maximum operating speeds. He stated further that, if the railroads are to operate trains at speeds of 100 m. p. h. and more, continued improvements in brake equipment will be necessary, as the hazards are steadily increasing at operating speeds above 60 m. p. h. The only reason, he said, that no serious wrecks have occurred so far is due more to Providence than to the ingenuity of management.

In the conclusion of his remarks, Mr. Patterson emphasized the necessity of providing better train signals and improved devices for making emergency applications from points in the train. He suggested that, inasmuch as cars are equipped with storage batteries, it might be possible to effect improved train communication between conductor and engineman by the use of electrical equipment.

Mr. Brown, in the course of his remarks, directed attention to the fact that the Bureau is receiving constant complaints of hard-riding locomotives and asked that at-



W. I. Cantley
Mechanical Engineer



V. R. Hawthorne
Secretary

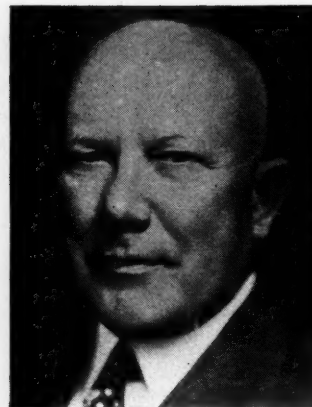
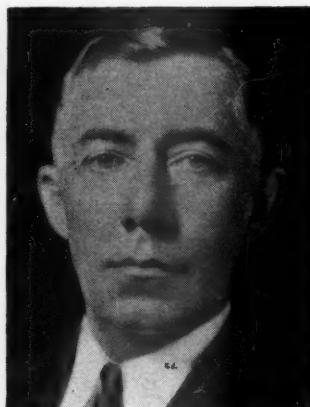
tention be directed to this problem by the members of the Mechanical Division. Replying to this, Chairman Hankins stated this matter is now under consideration.

In addition to the thirteen standing committee reports, an individual paper on The Operation of Diesel-Electric Locomotives was presented by H. H. Urbach, mechanical assistant to executive vice-president, Chicago, Burlington & Quincy. This paper and the discussion which it drew forth, will appear as a separate article in a subsequent issue.

In a review of its actions since the last annual meeting, at Atlantic City in June, 1937, the General Committee reported that the effective date of the commission's order in the mechanical-stoker case has been extended to April 15, 1944. The date before which all steam locomotives exceeding certain weights on drivers shall be equipped with power-reverse gears is September 1, 1942.

The committee reported that on April 27, 1939, an I. C. C. order dismissed the complaint of the employees in the automatic train-line connector case for want of prosecution and without prejudice.

During the forepart of 1936 the attention of the railroads was called to the possibility of their having to build



42 ft. 6 in. box cars for the handling of finished automobiles. By reason of the constant changes in the models and a tendency toward increased overall length, the present standard car had about reached its maximum capacity with the present auto loader insofar as length was concerned. This immediately caused much concern to the railroads, and about that time it was learned that two persons in Flint, Michigan, had just about perfected a device that would furnish 40 in. greater loading length in a standard box car.

A car was equipped with this device and after a number of demonstrations the Association acquired an exclusive license from the owners. After considerable development work on this device a car was equipped and demonstrations made at practically all automobile manufacturers' loading platforms. In addition a number of service tests were made. The experience gained by reason of these demonstrations and tests resulted in certain modifications.

Prints of this device in its final development have been supplied to those roads requesting same and arrangements for its manufacture and use are now being developed.

The General Committee reported the release of the A. A. R. air-brake test rack to Purdue University for instruction purposes. The association, however, is retaining its title to all test instruments with which the rack is equipped. This was done because larger test racks suitable for conducting tests with type AB brakes are available to the Mechanical Division at the plants of each of the air-brake companies. The General Committee also reported the formation of a sub-committee representing the Committee on Car Construction, the Committee on Wheels, and the Committee on Brakes and Brake Equipment, under the chairmanship of W. I. Cantley, mechanical engineer of the Mechanical Division which has formulated a program for the conduct of the tests of trucks for high-speed freight service. Twelve designs of trucks have been submitted for these tests which, as has already been announced, are now under way on the Pennsylvania between Altoona, Pa., and Lockhaven.

In the matter of arch-bar trucks the committee called attention to the fact that notice was sent to all car owners under date of May 27, 1939, that the board of directors of the A. A. R. has directed that the effective date for the removal of cars with arch-bar trucks from interchange be extended to, but not beyond, December 31, 1939. As of March 31, 1939, there remained 182,142 railroad-owned interchange freight cars, or 9.9 per cent; 6,086, private-line cars, or 2.2 per cent—a total of 188,288 freight cars, or 8.9 per cent—equipped with arch-bar trucks.

General Committee Members

Above—Left to Right

D. S. Ellis
O. A. Garber
R. G. Henley
F. R. Mays

John Purcell



The committee called attention to the fact that, on the recommendation of the General Committee, the board of directors of the A. A. R. approved as recommended practice of the association the specifications for new passenger-equipment cars formulated by a sub-committee consisting of representatives of the Committee on Car Construction and companies operating modern types of passenger equipment, under the chairmanship of W. I. Cantley, mechanical engineer of the division. The specifications are now included in Section C of the Manual.

Election of Members of General Committee

Following the presentation of their names by the Nominating Committee the following were elected members of the General Committee to serve until June, 1941: H. B. Bowen, chief of motive power and rolling stock, Canadian Pacific; H. H. Urbach, mechanical assistant to executive vice-president, Chicago, Burlington & Quincy; G. McCormick, general superintendent motive power, Southern Pacific, and Otto Jabelman, vice-president, research, Union Pacific. G. C. Christie, general superintendent equipment, Illinois Central, was elected to serve for the unexpired term of F. R. Mays, general manager, Illinois Central, resigned, which expires in June, 1940.

Chairman Hankins' Address

Chairman Hankins, in opening the convention, reviewed recent developments in the mechanical department and important aspects of the work of the Mechanical Division. He stressed the following facts.

The two years that have just passed have been lean ones in so far as concerns railroad revenues. Neverthe-

less, we have witnessed very definite progress in the development and use of improved railroad equipment and in methods of operation. Even in face of discouraging business conditions the railroads have made distinct advance in motive power and rolling stock and in equipment maintenance practices.

The arch-bar truck, a very bothersome problem for a number of years, practically has been eliminated, and its use in interchange service is prohibited after December 31, 1939.

New and attractive types of passenger equipment cars have been built and placed in service, operating on faster schedules. New and improved freight equipment cars have been designed and built. Many thousands of existing freight cars have been modernized and rebuilt, and considerable progress has been made in the application of improved air brakes to freight equipment cars.

Present demands of our patrons have resulted in speeding up the schedules both of passenger and freight trains. This has introduced additional problems relating to design and maintenance of equipment, for example, the arranged freight-train service. The present faster schedules are only a forerunner of what is necessary in the quickening of deliveries in order to retain traffic on the rails. To insure reliability of this faster service, the cars must be maintained in such condition that failure of details will not occur en route.

All these problems that face us require not only special study, but also prompt solution, and involve our meeting the situation courageously and without unnecessary delay.

Since the last meeting of this division, the office of mechanical engineer has been created, and W. I. Cantley selected by the General Committee to fill it. He has been given a number of assignments and cooperates with all standing committees of the division. This has resulted

in expediting consideration of important matters and will be developed further by the General Committee.

The purpose of the General Committee is not to build up a huge organization, but rather to have an efficient nucleus around which special machinery can be set up as required to handle important matters efficiently and with dispatch. The watch-word of your organization continues to be "Get things done."

At present we have before us the subject of development of trucks for high-speed freight service. The board of directors of the association has approved conducting road tests of trucks designed for this service. These road tests will be carried out to conclusion as early as practicable under direction of the mechanical engineer of the division and a special committee representing the Committee on Car Construction, the Committee on Brakes and Brake Equipment, and the Committee on Wheels.

A special committee has been appointed to survey the subject of counter-balancing of steam locomotives for high-speed service and to recommend whether or not tests should be conducted by the division.

Two years ago the General Committee recommended a research program on axles. This has been carried forward with expedition, starting with passenger-car axles, and to date three reports of progress have been submitted to the members so that they may be informed fully as to what is being accomplished. It is expected as a result of this research that modified design for passenger-car axles will be developed shortly.

The various standing and special committees of the division are entitled to credit and our thanks for the manner in which they have handled their assignments. With the reduction that has obtained generally in staff officers of the mechanical department—below what would have been considered a minimum several years ago—the members of your committees have discharged ably their duties in the work of the association, notwithstanding the additional work handled on the home road.

Among the outstanding achievements of the past year has been the development and adoption as recommended practice of specifications for new passenger-equipment cars. It was a fine example of prompt and efficient solution of a problem.

Address by Samuel O. Dunn

Samuel O. Dunn, editor, *Railway Age*, was the guest speaker. An abstract of his talk follows: All the great technological progress made in this country within the last twenty years has done no good, because the contribution it should have made to the public welfare has been prevented by government, business and labor with

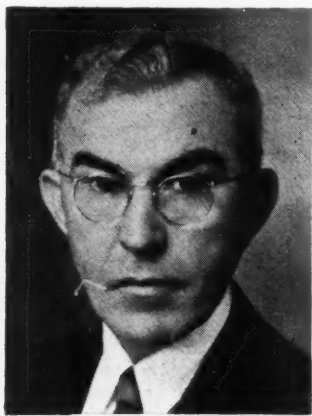
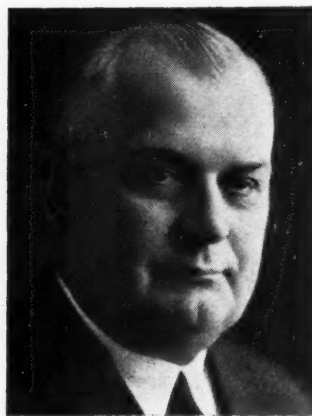


General Committee Members

◀ A. L. Ralston

Below—Left to Right

J. W. Burnett
E. B. Hall
J. A. Power
H. B. Bowen



the most ignorant, stupid, and ruinous economic policies ever suffered by a great nation.

A nation's total income is the measure of its well-being. It is usually stated in money, but it actually consists of the goods produced. The trends of our national income before and since the war present a shocking contrast.

We had recovered in 1896 from the panic of 1893. Allowing for differences in prices, and stated in volume of goods actually produced, our national income increased 82 per cent in the twenty years from 1896 to 1916—just before we entered the war—and our income per capita increased 30 per cent. During the next twenty years, from 1916 to 1936, when undoubtedly there was equal technological progress, our national income (measured in production) increased only 17 per cent and our income per capita actually declined 8 per cent. In 1938 our income per capita was actually as small as thirty-three years before in 1905.

We have heard it claimed that unemployment, and even all the ills of depression, within the last decade have been caused by technological progress amounting to a revolution. There has been a revolution all right, but no more of a technological one than before, because the increase of production from 1896 to 1916 shows there was at least as much progress in technology then as since. The revolution we really have had since 1916, and especially since the war, has been an economic one.

Before the war we had both technological and economic progress. We have since had only technological progress. There is much talk implying they are the same thing; but they are widely different things. If a factory employing a hundred men increases its output 50 per cent per man by improving its machinery, that is technological progress. If it also increases its production and sales 50 per cent, that is economic progress. But if it does not increase its production and sales and consequently throws one-third of its employees out of work, there is economic retrogression. And that is actually the way in which, during the last two decades, we have simultaneously made technical progress and economic retrogression in this country.

You and other technical men have done your work splendidly. In spite of all the aspersions regarding lack of research and so on, engineering work of every kind has been as well done on the railroads as in any other American industry. It made it possible during the twenty years before the war for the railways to double the amount of traffic they handled per dollar of investment, per employee, per locomotive, and per car. The lack since the war of such economic progress as occurred before has been due entirely to unsound economic policies followed by business, political, and labor leaders.

Technical men have worked in accordance with physical laws. Business, political, and labor leaders have nullified all that technical men have done by trying to disregard or override economic laws. All human experience has shown it can't be done—and never so conclusively as in the United States during the last decade. Unsound economic policies have ruined many more great nations than war. Whenever they unearth the ruins of a great nation anywhere, you may depend on it that it was ruined more by its unsound economic policies than by its enemies; because sound economic policies are as necessary in war as sound military policies, while unsound economic policies are about equally ruinous in either peace or war.

Great Britain suffered vastly more from the great war than this country; but, as compared with the period before the war, Great Britain is now relatively much more prosperous than the United States. Why? Because during the depression Great Britain's business, its labor, and

its government have followed the economic policies that pulled both Great Britain and the United States out of all previous industrial depressions, while we have followed entirely different policies. Hence, our economic revolution—backward.

Who started this economic revolution? Business—and it has since been ably assisted by politicians and labor leaders. Business started it when, before the war, in addition to railway regulation to stop unfair discriminations, it got regulation to curtail railway profits. Business continued it when it got our federal and state governments spending billions of dollars a year on waterways and highways to subsidize competition with the railways and thereby more effectively beat down their rates and profits. Our transportation situation, and especially our railway situation, has been among the principal causes of the depression and its long continuance.

We have had in this country what is called a system of "free private enterprise." In order to increase the national income as it did before the war, this system must operate in accordance with its own economic laws, the principal of which is supply and demand. From the depression of the nineties to the Great War most prices and wages were fairly flexible and were determined principally by supply and demand. But business began back there monkeying with prices (including railway rates) regardless of supply and demand.

These, in brief, are the causes of the economic revolution which has stopped our economic progress. They are the causes of the present railway situation because they have curtailed total production and traffic, diverted traffic from the railways to other carriers, and increased their operating expenses and taxes, with the result that their net earnings in 1938 were actually smaller than forty years before, in 1898.

Within the last week President Roosevelt has proposed, in addition to its present huge expenditures, that the federal government shall make about four billion dollars in "self-liquidating" loans to stimulate business, including a half billion dollars for buying equipment during the next three years to be leased or sold to the railroads. Their net earnings always have determined how much equipment and materials the railroads have bought, and I am unable to see how, without an increase in their net earnings, they could lease or buy any equipment from the government that they could not lease or buy direct from the manufacturers, while, if their net earnings did increase, they could and would increase their buying direct from manufacturers proportionately.

Their purchases of equipment and materials in 1938 alone were 972 million dollars less than in 1929, and in the last seven years they averaged 787 million dollars annually less than in the seven years ended with 1929. The proposed "government aid" would be mere chicken feed compared with the curtailment of railroad buying caused, and still being caused, by policies making net earnings less now than they were 40 years ago, and this entire new "self-liquidating" loan plan undoubtedly, in view of our experience with similar government policies for the last six years, would retard, rather than stimulate, business recovery and railroad earnings.

What is the correct answer? If we are to renew the economic progress made before the war, we must both continue the technological progress and restore the economic policies that then caused economic progress. Technological progress, if unaccompanied by sound economic policies, does more harm than good by aggravating unemployment and other evils of depression. Only when business, labor and government begin again to act in accordance with the economic laws and principles that the entire experience of the human race has demonstrated must be ob-

served can technical progress begin again to contribute to our economic progress and prosperity as it formerly did. Continuing to tinker with the effects of the depression will simply continue to prolong it. We must remove the causes of it, which are, I repeat, the most ignorant, stupid, and ruinous economic policies ever suffered by a great nation.

Lubrication of Cars and Locomotives

Your committee has held one meeting during the past year at which time a joint conference was held with the Committee on Specifications for Materials to consider tentative specifications covering (1) renovated car oil and (2) renovated journal-box packing. These specifications were developed jointly by members from the two committees and the results are included in the report submitted by the Committee on Specifications for Materials.

The Committee on Lubrication joins the Committee on Specifications for Materials in recommending that Specifications M-904-39, Renovated Car Oil, and M-910-39, Renovated Journal-Box Packing, together with the proposed changes in Rule 66 of the 1939 Revised Code of Rules, and Page 35-B-1937, Section L, of the Manual be approved for submission to Letter Ballot.

A. A. R. Interchange Rule No. 66

It is appreciated that there has been some degree of improvement in the results obtained from better lubrication practices instituted with the adoption of A. A. R. Rule 66. Nevertheless, the anticipated benefits to be derived from the rule cannot be fully realized so long as cars are stencilled as being repacked without conforming to full requirements of the rule.

Despite the better performance record, there is great opportunity for further improvement when considering the effects and related costs resulting from burned-off journals, the cost of setting out a car enroute in a train, the complications from a traffic standpoint, and the cost of reconditioning damaged journals for continued service. Increased speeds to meet highway competition make the main objective one of uninterrupted train operation and to that end journal lubrication plays an important part.

To reflect some idea of the situation, the record for the year 1938 of one large eastern road shows 7,846 freight-car hot boxes with an average of 195,000 miles per hot-box failure. The total train detentions due to journal heatings amounted to approximately 2,800 hours. Of the total number of hot boxes, 47 per cent occurred on owned cars representing 74 per cent of the cars on line; 30 per cent on foreign railroad cars representing 17 per cent of the cars on line, and 23 per cent on private line cars, representing 9 per cent of cars on line.

It is the feeling of your committee that substantial improvements can be further realized if Rule 66, with modifications now being submitted for approval, and other related A. A. R. standards are adhered to. It should be noted that a new requirement is included in Rule 3 of the 1939 Code of Rules for the interchange of traffic to provide that, effective January 1, 1940, packing for journal boxes must be prepared and boxes repacked in accordance with A. A. R. standard practice, as defined in Rule 66, on all cars from owners. Furthermore, the necessity for strict compliance with the rule has been emphasized by letter of January 16, 1939, on behalf of the General Committee addressed to the members and car owners.

The time limit for periodic repacking of journal boxes is now fifteen months. The committee has been asked to consider a proposal to reduce that limit to twelve months, predicated on a study made by one member road of 1,783 hot boxes.

Using the data from this road to compare with a similar study made by a second member road to indicate in what elapsed time after the stencilled packing date heatings occurred, the following comparative statement is presented:

	Road A		Road B	
	No. of heatings	Per cent of total	No. of heatings	Per cent of total
Within 2 months.....	149	8.4	1,086	14.6

From 3 to 6 months, incl.	557	31.2	1,871	25.1
From 7 to 10 months, incl.	487	27.4	1,899	25.5
From 11 to 15 months, incl.	465	26.0	1,764	23.7
Over 15 months.....	125	7.0	830	11.1
Total	1,783	100.0	7,450	100.0

It should be noted that in the case of Road A 67 per cent of the total heatings occurred within ten months of the stencilled packing date and for Road B 65.2 per cent occurred within the same elapsed time.

It is generally recognized that journal-box packing of inadequate quality is a contributing cause of journal heatings. Stencilling of cars but failing to perform all the work as required by Rule 66; using improperly prepared packing or improperly applying good packing does not help to produce satisfactory lubrication performance.

Change of packing in the spring and again in the fall has been advocated but as this procedure would seem to be impracticable as well as costly, it is the opinion of the committee that before shortening the repacking period it would be advisable to comply with the accepted and recommended measures for protecting journal lubrication after which further data could be developed.

Method of Packing

In the method of packing boxes, some roads deviate somewhat from details outlined as standard practice in Rule 66, particularly for passenger service. One method employs loosely twisted rolls and another rolls without twisting. In both methods two, three, or four rolls as may be necessary, depending upon journal size, are applied with the ends tucked down at the side walls and no part of the packing extending above one inch below the center line of journal. These methods appear, when properly carried out, to result in a more nearly uniform application by the various box packers and according to reports, it has effected a noticeable reduction in the number of waste-grab cases.

Car Oil

Attention has been called to a number of axle journals found with pitted surface, particularly in the case of rolling stock that has been out of service for prolonged periods, making it necessary to machine-finish the journals before they are returned to service. The indications are that the pitting may be due to traces of acidity found in some mixtures of oil and waste, which, in the presence of moisture, forms a dilute acid which attacks the steel journal. Some new car oils have been found to give an acid reaction and other car oils do not reflect such indication. It does not seem unreasonable to expect, under the present art of refinement, that all new car oils as well as renovated car oils shall be acid-free. One railroad system, and there may be others, rejects shipments of car oil on the basis of an acid reaction. Therefore, in the interest of taking steps to eliminate at least one cause for the development of pitted journals and to discourage a railroad from accepting an acid oil for use in interchange that another road has rejected, it has been recommended that Specification No. M-906-34, New Car Oil, be revised to contain a requirement showing neutral reaction to acid content.

It is well established that excessive water in journal boxes is a hazard to adequate lubrication, particularly in combination with dirt and other contaminations accumulated in service, and it is questionable that the demand for a water-free journal box assembly can be met within reasonable cost limits. Therefore, if any member has information to indicate that oils which separate almost instantly from water as contained in journal boxes are better lubricants than those which do not separate readily or vice versa, particularly in the presence of fine dirt, it would be helpful if such information could be furnished to the committee.

Waste

The quality of waste used for journal-box packing is a very important factor. Many roads use renovated waste in preparing packing for freight equipment. For passenger service all new, a mixture of renovated and new or all renovated waste is used quite successfully when the quality of the renovated materials are of a high order, in which case, in addition to the cleanliness of the waste, there is also the additional element of improvement

due to the removal of the free lint and increased oil retention that renovated waste of this quality has over new waste.

Because of a wide divergence of opinions as to what constitutes a good grade of waste, the A. A. R. specification is necessarily broad, permitting many optional materials. Nevertheless, until such time as the range of grades can be narrowed to an acceptable standard, new waste should at least conform to A. A. R. Specification M-905-34.

Journal Bearings

Bearings with refinements in design, manufacture and finish known to be used in passenger service are those with lengthwise slots of various forms in the lining metal adjacent to edges for the purpose of trapping lint and waste strands; so-called "circulating," "vacuum," "self-cooling" and "oil-control" bearings provided with communications between the side slots through which excess oil passes, thereby aiding in the dissipation of bearing heat; milled back surface to insure a smooth bearing parallel with the broached journal surface and in addition to the milled surface, bearings with center depressions cast across the back are being used. This latter development is the result of tests which showed that even with a bearing with machined flat back there is a tendency for the bearing to warp under heat and produce a concentrated loading effect with the area which bears on the journal confined to the center. By virtue of the back center depression, the load on the journal is more evenly distributed through the full length of the journal bearing.

Wedges

In some instances, it has been the practice to reclaim wedges by reforcing under a steam hammer, using dies for the purpose of restoring the convexity of the top surface and flattening the undersurface. This frequently produces unsatisfactory results.

A number of wedges have been found with the apex of the 78 in. radius crown coinciding with center line located at a point one-half the dimension of the overall length, which is one-half of dimension B shown on the wedge drawing or, in effect, a tapered wedge. This is contrary to the intent of the drawing which locates the apex of the crown at a point one-half the length of the surface that rests on journal bearing, or one-half of dimension A.

Despite the requirement in Rule 66 that the use of hollow-back or corrugated-back wedges is not permitted, such wedges have recently been found in service.

One road, and there may be others, has adopted the practice of machining the crown and the under face, also the back end, of wedges for passenger service. To reclaim wedges the surfaces are machined where necessary within limiting dimensions. This practice has resulted in restoring numerous wedges to passenger service that otherwise would have been diverted to freight or scrapped. Eventually such machined wedges will get into freight service.

Where machined-back journal bearings are used it is advantageous also to use a machined wedge.

The back end of wedges is commonly irregular and sloped due to the draft in dies. By using wedges with this end surface machined square with the under face, there has been a definite reduction in the number of broken bearing collars.

Journal Boxes

It is desirable that ceiling of journal boxes be flat; location and dimensions of stop lugs, and dust-guard well dimensions be in strict conformity with the A. A. R. requirements. Dust-guard well surfaces should be reasonably smooth; the lid hinge-pin lug should be in correct position and the flat machined or ground box mouth rim should be in proper position with respect to the center of the lug hole.

Badly worn hinge-lug contour can be restored by applying welding metal and grinding to proper shape. Worn lug hole can be restored to normal by welding and re boring or by securing a suitable steel bushing in place.

Dust Guards

The results of a survey made some time ago indicate that there is a need for substantial improvement in the dust guard. Al-

though considerable study has been given to this complex problem, your Committee is not in a position to make definite recommendations with the view of adopting a more effective seal at this time. For freight equipment, the more effective sealing dust guards than the A. A. R. standard that are available are prevented from receiving favorable consideration because of their cost.

One member road, having in general use under passenger equipment a dust guard with a more effective seal, reports finding accumulation of water in journal boxes which was not found in boxes with less efficient dust-guard seals. However, the desirability of effectively sealing the back of the journal box against the loss of oil under extreme conditions of infiltration of water and dirt into the box is recognized as an improvement. With excessive water entering the front of the journal boxes, which was the case with boxes with dust guards tight enough to hold the water in, once it entered the box, the tight dust guard prevented the water floating the oil out the back of the box.

In roller-bearing boxes, the construction of which is relatively tight, water was also found by the same road which would indicate that it is a difficult problem to prevent the accumulation of moisture in a journal box.

In view of the importance of the problem, it is recommended as a minimum requirement that the top opening of the dust-guard well be sealed by plug or cap, provisions for which have already been adopted, and that well constructed dust guards, complying with A. A. R. requirements be maintained.

[The committee included a suggestion for a revised dust-guard specification M-903-34. New requirements in the proposed specification are that dust guards withstand submersion in water and in car oil separately at temperatures of 212 deg. F. for a period of 24 hours and specific reference to a number of defects from which the wood in dust guards must be free. Complete provisions regulating inspection, rejection, and rehearings have also been added.—Editor.]

It is recommended that the present Specification M-903-34 be continued in effect and that the foregoing suggested revision be circularized among the members of the Association with request that suggestions or criticisms be submitted for further consideration by the committee.

Box Lids

Attention is called to a requirement in Rule 66, paragraph 9, under the heading "Journal Boxes" to the effect that "when new journal boxes are applied, or when reapplying boxes, box lids complying with A. A. R. specifications shall be applied."

In connection with Specification M-120-35, covering the journal box lids, the committee has recommended that the outline of flat spring be deleted from the diagram shown on page 3 in order to avoid confusion with the requirement under par. 4 (b) which specifies "springs of the coil type to be used." This change will be made in the next revision of the manual.

As information, a few member roads are experimenting on passenger equipment with means for positively locking lids in closed position for the purpose of preventing vibration and to resist the raising of lids by ice formation between lid and box.

Axles

For this subject, including the finish and protection of journals, it seems sufficient to refer to the A. A. R. Wheel and Axle Manual which adequately covers all requirements thus far developed.

Truck Assembly

Details of design and mechanical condition of the entire truck assembly also have an important influence in acquiring successful lubrication performance. Observations of your committee and information coming to it indicate that control of lateral and the lubrication of the thrust bearing areas in conventional truck assemblies add to lubrication difficulties, particularly on roads having relatively numerous curves. That this is appreciated by one bearing manufacturer and by some roads experiencing increasing lubrication and maintenance troubles resulting from lateral is evidenced by activities during the past year in the modi-

fication of bearing and wedge design, and journal-box assembly tolerances with a view of controlling lateral thrust and wear, and improving service performance.

Your committee in this year's report has dealt with car oil, waste, bearing, wedge, box, dust guard, lid and axle details as separate items. It is of the opinion, however, that further improvement in journal performance through the correction of certain mechanical irregularities and changes in the design, manufacture, and maintenance tolerances of truck assembly details, which is not within its province, is a matter of sufficient importance to warrant study by a special joint sub-committee of members to be selected from the standing committees involved.

Pursuing the matter of steam and Diesel locomotive lubrication, your committee prepared a rather elaborate and all inclusive questionnaire which was forwarded to thirty-nine Class I railroads, which railroads operate in excess of 80 per cent of the locomotives owned by all class one railroads, in an effort to determine various practices and approach to standard in the matter of lubricating various wearing parts of the locomotive. Replies were received from 34 railroads and the results tabulated, which has permitted this committee to draw the following conclusions:

Lubrication of Steam-Locomotive Engine Trucks

In general, the common standard on all roads replying for engine-truck lubrication, consisted of oil-saturated waste contained in a cellar. In twenty-nine cases prints were furnished and indicated that this cellar was fixed; that is, a solid container for the waste was provided and held in the engine-truck box with various types of retainers, keys or bolts. Two roads reported that they were using the spring-loaded design of engine-truck cellar. This cellar consists of a cast-iron shell equipped with prongs designed to prevent the packing rolling, and the shell is packed with oil-saturated waste and held against the journal by a combination of yokes and coil springs. The advantage claimed for this design is that, it insures contact between the packing and the journal at all times. There is a further advantage in ease of servicing or repacking.

Where the rigid cast-iron box cellar is used there are various methods of securing the cellar in place, generally by means of a tapered slot in the box, the taper usually approximately one in eight, which receives a corresponding rib on the cellar. The intent is to compress the packing gradually as the cellar is forced into place. Many roads use a similar arrangement only with a horizontal tongue and groove.

There are a variety of methods of securing the cellars ranging from simple horizontal key bolts, diagonal key bolts and patented spring locks. Several roads indicated that they were using removable end plates in engine-truck cellars in order to facilitate servicing without removing the cellars. It was noted in such cases an oil well was provided in the cellar below the bottom opening of the end plate for retaining the oil.

The types of packing used range from one-hundred-per-cent wool waste to straight cotton packing. Two roads reported their common standard as a spring-loaded pad with feeders extending into an oil well in the bottom of the cellar with oil fed by capillary attraction; two roads reported oil and waste with auxiliary oiling from force-feed lubricators.

Practically all of the roads reported that engine-truck cellars are serviced each trip where oil and waste packing is used. A number of the roads reported that some special method of lubrication is provided for the engine trucks, such as spring-loaded pads, a pad fed by an individual oil pump; the use of an air-actuated hand-operated pump and oiled waste, or other mechanical force-feed lubrication for engine-trucks. Twelve roads reported the use of roller bearings of several different designs on engine trucks.

While the vast majority of locomotives appear to be lubricated with the waste-packed cellar, the efforts being made to improve lubrication, improve performance and reduce servicing costs, gives evidence that a change is generally desired.

In considering engine-truck lubrication the committee finds that there is a variation in practice as to application of lubrication. While it is generally applied to the cellar or waste packing, some roads still free-oil through a cavity in the top of the bearing. A number of roads have reported the use of specially designed so-called circulating bearings or lining of

special composition as submitted by various manufacturers, but the extent of the use, considering the group of roads investigated, is not sufficient to permit of a conclusion.

There is a trend towards application of roller bearings to new power and the use of mechanical lubrication to oil-saturated waste in existing engine-truck installations.

Trailer Trucks

A summary of the replies with reference to standard design and practice for lubrication of trailer trucks in general corresponds with the information furnished covering engine trucks.

The standard practice for either outside or inside bearings appears to be a fixed cellar with oil-saturated packing with about the same variation between the grade of packing used as was evidenced in the survey of engine trucks. There appears to be less attempt to employ force-feed lubrication for adding oil to the cellar or packing than with the engine trucks.

Four roads reported the use of roller bearings on trailer trucks; seven roads reported a special type of lubricator, either a pad fed by an individual oil pump or several types of spring-loaded pads.

The most conclusive report on other than waste packing comes from one road which reported the adoption of a spring-loaded pad as a standard on heavy freight and passenger locomotives. They reported 103 passenger locomotives and 128 freight locomotives so equipped and advised that the service has been entirely satisfactory after a total operation of 52,000,000 locomotive miles.

Two roads reported rather extensive use of pads fed by individual oil pumps, one road on 48 passenger and another on 78 passenger and 180 freight locomotives. One road reported satisfactory service and the other generally satisfactory service except for some breakage of parts and entrained dirt that stops up the oil passages.

Driving Journals with Oil Lubrication

From the replies made to the questionnaire there is evidence of an increasing tendency to substitute oil lubrication to driving journals in place of grease. Thirteen roads reported the use of oil lubrication in one form or another, exclusive of those utilizing roller bearings in this location. Four roads reported on nineteen applications of pads fed by individual oil pumps. Two roads reported on 162 locomotive applications (42 of these on all journals except main), of a spring-supported pad. These applications have been made to locomotives in both freight and passenger service and satisfactory service has been reported on speeds in excess of 75 miles per hour in passenger service and 50 miles per hour in freight service for the above applications.

One road reported on force-feed lubrication of valve oil on a Pacific type passenger engine which is under test. Another road reported installation of waste-packed cellar, similar to engine truck, to a switch engine in November, 1937, for test purposes, and apparently the service to date has been satisfactory. Three roads reported on 54 locomotive applications of waste-packed cellars similar to engine and trailer trucks, and 46 of these locomotives are in slow speed heavy freight service.

There is a new development on the market, and now under test. This incorporates a floating axle flooded in oil by a pump actuated from the movement of the locomotive and running in a bronze bushing, and a lateral device consisting of a collar forged into the center of the axle to which wear resisting plates are opposed and, like the journal bearing, flooded in oil. This, in effect, is a full floating axle. In view of the interest indicated in application of oil lubrication to locomotive driving journals, this device holds interesting possibilities, although to date tests have not progressed sufficiently to indicate the ultimate results that may be obtained.

Pump-fed and spring-loaded pads have undergone a rather wide range of tests. Some difficulties have been reported due to broken springs resulting in failure to keep the pad of either device against the journal, but in general the service has been quite satisfactory and apparently the difficulties are being gradually overcome.

Your committee recommends further study of the application of oil lubrication to locomotive driving journals for the reason

that in addition to reduced friction through the use of oil in place of grease for journal lubrication, there is the advantage of lower operating temperature, less liability to stuck wedges and the possibility of diverting a portion of the journal lubrication to regularly and consistently lubricate shoe, wedge and lateral bearing faces.

Lubrication of Engine- and Tender-Truck Center Plates

Evidence of the interest devoted to improving lubrication of engine- and tender-truck center plates is evidenced by the fact that, of the 34 roads reporting, eighteen roads reported efforts to lubricate this bearing by other methods than the application of lubrication at various times when the castings are separated by jacking, including soft-grease lubrication; oil cups; mechanical force-feed lubrication; bronze or hardened-steel wearing plates drilled for oil distribution, and the oil piped to enclosed cavities in the castings.

Eighteen roads reported on the use of soft grease applied with a pressure gun to various systems of grooving which is used more extensively than any of the other improved systems reported upon, and from the reports of reduction in wear appears to be satisfactorily serving the purpose.

Radial-Buffer Lubrication

Twenty-four of the roads replying to the questionnaire indicated that they are using a different method of lubricating radial buffers other than hand oilers. All of the roads, with the exception of two, were using a soft grease applied from a pressure gun, and four roads reported the use of oil lubrication from special containers or from mechanical lubricators using splitters on some engines and soft grease on others. The use of soft grease has been standardized on at least eight roads, and one road uses crude oil.

Those who estimated a reduction buffer in wear were agreed on a fifty per cent reduction. In this connection, a number of roads have employed the use of a shield above the chafing casting in addition to the lubrication, in an effort to exclude coal dust and foreign particles from the wearing surfaces.

Drifting Valves

Fifteen roads out of thirty-four are using drifting valves on 1,842 locomotives. They indicated that the purpose of applying these drifting valves was to provide distribution of lubrication to valves and cylinders, while the locomotive was drifting, to reduce formation of carbon and provide some compression for cushion of reciprocating parts while drifting, and the replies for the individual roads vary from one locomotive on test to 316 locomotives in regular service.

Ten roads indicated definitely that the device had served the purpose of improving lubrication and reducing the formation of carbon. One road reporting on 283 drifting valves and 12 bypass valves indicated the by-pass valves had functioned entirely satisfactorily, but the drifting valves had not proven entirely satisfactory when drifting at high speeds.

In answer to the question as to fuel saving, four roads reported no record; one road, operating 240 locomotives, indicated a doubtful saving, and the balance indicated they have found a saving in fuel.

Material for Valve and Cylinder Bushings

The summary of the reports indicates the tendency to get away from common gray iron castings for these important wearing surfaces. There are a number of tests of materials which hold considerable promise and which tests have not proceeded sufficiently far to justify extensive installation.

One road reported on a material with the trade name Meehanite, which material is susceptible to heat treatment, and in the heat-treated condition has superior physical qualities as compared with ordinary gray iron. The tests of these bushings in the heat-treated state have indicated possibilities of satisfactorily using this material for bushings.

The use of sectional piston packing was reported by all roads except two and has been adopted as standard on many of the

larger roads representing the majority of the locomotives from the roads reporting. The use of sectional valve rings is less general than the use of sectional piston rings. Reports show approximately fifteen per cent as many locomotives equipped with sectional valve rings as were equipped with sectional piston rings, however, use has become quite general as evidenced by the fact that twenty-two of the thirty-four roads reporting reported the use of sectional valve rings on certain locomotives, or they have standardized on the sectional valve rings or have extensive tests under way.

Invariably the reports indicated that there was considerably increased life from the sectional valve and piston rings, ranging from 100 to 250 per cent.

Methods of Lubricating Engine-Truck, Driver and Trailer Hubs

The reports indicate that the necessity of ample lubrication of these parts is appreciated and that some method other than the hand oiler is desirable. This is evidenced by the fact that practically all railroads replying indicated one of many various methods, ranging from the hand oiler in the hands of the engineer, crater compound and soft grease applied at engine terminals with a paddle, and to the use of valve oil applied through force-feed lubricators.

A number of the roads reported on the use of soft grease applied by means of a pressure gun and special fittings to cavities drilled through the hub of the wheel, and they indicated that this arrangement is quite satisfactory.

With the advent of the various types of dividers or splitters now available for use with force-feed lubricators, many locomotives of recent design, as well as heavy locomotives as they pass through the shop, are being equipped with these dividers which insure a regular distribution of engine oil, or equivalent oil, to the various hub-liner faces as well as to other bearings, and since the regularity of the application of lubricant is greatly to be desired it appears to your committee that any of the various methods of accomplishing this through the use of force-feed lubricators is deserving of serious consideration, and especially so on locomotives on long engine runs. Such applications properly maintained should pay good dividends in trouble-free performance, elimination of servicing enroute as well as reduction of lateral wear.

Method of Lubricating Guides

The replies received indicate the necessity for improved lubrication to locomotive guides. While the syphon oil cup, or oil cups equipped with a wick feed largely predominate on the older types of locomotive, the modern locomotives and locomotives under heavy duty in high-speed service are being rapidly equipped with force-feed lubrication. Apparently many of these applications have been made in an effort to use existing lubricators since a number of the roads are using valve oil through dividers to lubricate the guides. Other locomotives that are equipped with a second engine lubricator are using engine oil on the guides as well as other wearing parts of the locomotive. However, practically all of the roads indicated that the force-feed method is most efficient and satisfactory.

Method of Lubricating Shoes and Wedges

Many locomotives have no provision for lubricating shoes and wedges other than hand oiling usually through waste pockets in the top of the box which are saturated with oil with the hope it will find its way through various passages and grooves to the face of shoes and wedges. The deficiency in this system and the principal objection to it is the fact that its success is dependent first, upon terminal forces to maintain the waste pads and, second, upon the attention given by the enginemen at initial terminal and enroute.

A large number of locomotives have been equipped with grease cavities to which soft grease is applied by the use of a pressure gun. This method is generally considered superior to hand oiling as evidenced by the fact that at least ten roads out of the thirty-four have indicated this system as their preference over hand oiling. There are objections to the use of soft grease; first,

due to the tendency of terminal forces to apply an excessive amount and, second, the tendency on the part of the grease to increase its flow, sometimes in excessive amounts, after driving boxes reach a normal running temperature.

The extension of lubrication to these parts by means of force-feed lubricators through the use of dividers is increasing. On the majority of locomotives of recent construction, and particularly those with roller bearings, the mechanical lubricator has been generally adopted.

Specifications of Diesel Crank Case Oil

There is considerable range in the specifications of crank-case oil used by those roads operating Diesel-powered high-speed main-line trains, the majority using such an oil approximately of the specifications SAE 50. It is evident that many of them purchase oil for this purpose by brand.

Those roads operating locomotives in switching service also use a wide range of crank-case oil, but generally an oil somewhat heavier than SAE 50, with a tendency to vary the pour point between summer and winter, depending upon the territory in which the operation is carried on.

The practice as to mileage between oil changes is as varied as the source of supply. In road service the railroads reported oil changes ranging from 2,500 miles to 10,000 miles, and in yard service from three months to 25,000 miles. This wide variation may be explained in part through the use of continuous type filters located upon the unit in some cases, and in other cases upon the nature of the service performed.

In view of the claims of the damaging effect of acidity in crank case oil, the committee's questionnaire was designed to develop any troubles from this source and the method of correcting same. The thirteen roads operating Diesel engines advised they had experienced no difficulties traceable to acidity in crank-case oil. One or more roads advised they had arranged their oil changes in order to avoid development of acidity and apparently had been successful.

Lubrication of Armature Bearings

Armature bearings seem to be quite distinctly divided, with roller or ball bearing predominating on locomotives in road service, and waste-packed friction bearings on locomotives in yard service, although a number of roads reported roller or ball bearings on switch engines.

The servicing period for the ball or roller bearings vary with the service requirements. In general the grease cavities are filled to approximately half their capacity when the unit is placed in service; thereafter the pinion end is lubricated with from four to eight ounces of grease at intervals of from 4,500 to 23,000 miles. The armature end is lubricated with from four to twenty-four ounces of grease at intervals of approximately 20,000 miles. In general a good grade of ball-bearing grease is used, usually a brand recommended by the bearing manufacturer.

In switching service invariably long-strand wool waste is used for packing, and the grade of lubricant used varies from SAE 30 to a mixture of fifty per cent car oil and fifty per cent crank-case oil and various oils apparently purchased by brand.

Method of Lubricating Axle-Cap Bearings

Axle cap bearings are uniformly lubricated by the use of long-strand wool-waste wick held securely against the journal by means of balls of waste and in many cases additional pressure is applied against the wick by means of a loaded steel plate to insure packing against jarring or shaking away from the journal. This practice is in accord with the various motor manufacturers' recommendations.

Two roads reported having experimented with force-feed lubrication to the oiled wick to insure ample lubrication at all times. There is no evidence that this practice is being extended. The greatest variation in the practice of lubricating axle cap bearings appears to be in the service period. Some inspect and reservice each trip and others on thirty days' inspection.

That the type of bearing and service obtained from the method of lubricating axle cap bearings has been entirely satisfactory can be based upon the replies of twelve of the thirteen roads report-

ing on operation of Diesel units to the effect that they had experienced no difficulty and had no recommendations for improvements; the remaining road failed to answer this question.

The report was signed by E. L. Johnson (chairman), engineer of tests, New York Central; H. P. Allstrand, principal assistant superintendent motive power, Chicago & North Western; J. R. Jackson, engineer of tests, Missouri Pacific; P. Maddox, superintendent car department, Chesapeake & Ohio; and A. J. Pichetto, general air brake engineer, Illinois Central.

Discussion

The first speaker during the discussion suggested the idea of ribs being welded in the car journal boxes to keep the waste down in the lower portion of the box, and requested that other roads try this arrangement. The next speaker stated that pressure grease lubrication of center plates had not been found entirely satisfactory, but that oil, using the same piping arrangement as with grease and with a suitable seal, was providing satisfactory lubrication.

Two other speakers, discussing the lubrication of Diesel engines, stressed the importance of maintaining a clean air supply to the engine by the use of suitable filters and the last speaker made the comment that the successful lubrication of Diesel engines depends, to a great extent, upon filters and cooling equipment. On the road that he represents the practice has been adopted of taking weekly samples of oil from the crank cases of all Diesel engines and sending them to the laboratory for analysis. It has been found that the viscosity and precipitation number are the most important elements in the analysis, and that, as a result of this practice, it has now become possible, on one class of Diesel-electric locomotives, to limit the oil changes to one each twelve months, subject, however, to the weekly laboratory analysis.

(The report was accepted.)

Report on Specifications for Materials

The committee during the past year has reviewed all of the material specifications and considered comments and criticisms submitted by the members and others. The following revisions are submitted for your consideration:

Specification M-101-37—Axles, Carbon Steel, for Cars and Locomotive Tenders.—The scope of this specification has been revised to include axles up to and including Class E instead of up to and including 6½ in. in nominal diameter at the center.

Specification M-108-37—Boiler Tubes, Lap Welded, Electric Resistance Welded, and Seamless Steel, and Lap-Welded Charcoal Iron.—This specification has been revised to include specific reference to electric resistance welded tubes and to include a thickness tolerance specification for tubes manufactured by this process.

Specification M-111-36—Pipe, Furnace-Welded, Electric Resistance Welded, and Seamless Steel.—A number of typographical revisions and changes in A. S. T. M. and A. S. A. references to agree with the latest revisions were recommended.

Specifications M-302-37, M-304-36, and 305-36.—The first of these specifications covers refined wrought-iron bars, in which a typographical correction is noted which has already been made in the Manual. The other two specifications cover hollow-rolled and solid staybolt iron, respectively. Reference to iron scrap has been removed from the definition section of these two specifications.

Specification M-402-34—Malleable Iron Castings.—The following sentence has been added to the process section of the specifications: "Castings shall be free from primary graphite."

Specification M-911-39—Brushes.—This is a new specification which has been written to cover brushes—bristle, hair, fibre, and wire. The specifications cover paint and varnish brushes for master painting and utility purposes in general railroad use, as well as roofing, scrub, wash, duster, and wire brushes which are in general use.

Specifications for Car Oil and Renovated Journal-Box Packing.—As a result of joint conferences of the Committee on Specifications for Materials and the Lubrication Committee, revisions

and new specifications have been prepared covering reclaimed car oil, new car oil, and renovated journal-box packing. Specification M-904-39—Renovated Car Oil—has been completely rewritten to include detailed instructions on the procurement and handling of samples and methods of analysis. The properties of car oil, recovered from used journal-box packing after passing through the renovating process, which are acceptable under the specifications are shown in the table. Specification M-906-39—

Required Properties of Renovated Car Oil Recovered from Used Journal-Box Packing

Items	Requirements
(1) Flash (open cup).....	Not less than 300 deg. F.
(2) Saybolt univ. viscosity at 210 deg. F.....	Not under 45 sec.
(3) Saybolt univ. viscosity at 100 deg. F.....	Not over 725 sec.
(4) Water	Not over 0.20 per cent
(5) Total impurities, including tarry matter.....	Not over 0.75 per cent *
(6) Qualitative test for mineral acidity.....	Zero
Qualitative tests for alkalinity.....	Traces

* Lead and lead compounds will not be considered as impurities. Total lead in impurities shall be calculated as lead oxide (PbO) and subtracted from total impurities.

New Car Oil—has also been completely rewritten to include more details of methods for sampling and analysis. The properties specified, however, have not been changed except for the addition of the requirement that the oil must be neutral to methyl orange and phenolphthalein. New Specification M-910-39 covers renovated journal-box packing. This includes the general subject matter now covered in Rule 66 and in Methods of Analysis of Reclaimed Waste—Section L of the A. A. R. Manual, amplified as to details and methods of sampling and methods of analysis. The properties to which the renovated journal-box packing are required to conform are given in the table. Suit-

Required Properties of Renovated Journal-Box Packing

Items	Packing
Clean dry waste.....	20 per cent min.
Total impurities (including tarry matter).....	5 per cent max.
Water	2 per cent max.
Oil	Balance

NOTE:—Percentages, based on weight of original sample, as 100 per cent.

able revisions of Rule 66 and Section L of the Manual to conform with the new packing and revised oil specifications are also recommended.

The report was signed by T. D. Sedwick (Chairman), engineer of tests, Chicago, Rock Island & Pacific; E. E. Chapman (Vice-chairman), mechanical assistant, Atchison, Topeka & Santa Fe; Frank Zeleny, engineer of tests, Chicago, Burlington & Quincy; H. G. Burnham, engineer of tests, Northern Pacific; H. P. Hass, engineer of tests, New York, New Haven & Hartford; J. R. Jackson, engineer of tests, Missouri Pacific; H. G. Miller, engineer of tests, Chicago, Milwaukee, St. Paul & Pacific; J. W. Hergenhan, assistant engineer, test department, New York Central; L. B. Jones, engineer of tests, Pennsylvania; C. R. Bryant, engineer of tests, Southern; and W. R. Hedeman, engineer of tests, Baltimore & Ohio.

(The report was accepted and the recommendations referred to letter ballot.)

Report of Committee on Wheels

The committee, in its last report, commented upon the practice followed by some users of cast-iron wheels in connection with grinding the treads of the wheels either before or after mounting. In response to a questionnaire sent out by the secretary, soliciting information, replies were received from 27 railroads and private car lines, but in no instance was any definite information available. All replying to the inquiry seemed satisfied the grinding of the treads was a desirable practice, but as to the effect of such grinding, no definite information was available. The situation with respect to the value of ground wheels from the standpoint of reducing damage to lading was complicated where some information might have been available because snubbing devices have been applied to the trucks.

It is the opinion of your committee that the value of the use of truly round wheels will be reflected more in the reduction in truck maintenance than in a reduction in damage to lading.

Your committee is continuing its study of this subject and again solicits the roads following the practice of using ground wheels for any concrete information they may be able to develop with respect to the advantages obtained by this practice.

Single-Plate Bracketed Solid Hub Design Cast-Iron Wheel

The 1938 wheel committee report contained an account of authorization granted for certain types of experimental cast-iron wheels which included wheels with bracketed type plates and cored hubs. In this same report the committee expressed itself as being reluctant to accept the cored hub design without more intimate knowledge as to what might develop as a result of the cored hub.

In the meantime the Association of Manufacturers of Chilled Car Wheels developed and produced a bracketed single-plate wheel with a solid hub for 40-, 50- and 70-ton cars and requested authority to manufacture and place in service 100,000 wheels of each capacity, making a total of 300,000 wheels of this particular design. This request was approved by the General and Wheel Committees.

It is the opinion of your committee that the single-plate solid-hub, bracketed type wheel is a better design than the present standard single-plate wheel. This design has an advantage in that the plate is moved outward and thus better supports the outer portion of the rim and in this respect should be better protection against broken rims. Further, the bracketed feature on the back of the plate affords better support to the flange section and is claimed by the manufacturers to influence a more uniform chill.

Your committee considers that the single-plate bracketed solid-hub type of wheel has sufficient advantages to warrant recognition over the present standard single-plate design and therefore recommends that the question of adopting this improved design of wheel to replace the present design of single-plate wheel be submitted to letter ballot of the members. This design of wheel is illustrated in Fig. 1.

The cast-iron wheel specifications have been tentatively revised, as shown in Appendix A, for study and consideration of the members during the coming year. (Appendix A is not shown in this abstract.)

Hub Clearance on Cast-Iron Wheels

A member road has reported that journal boxes, especially those on integral side frames, are contacting and being worn by the hub face of cast-iron wheels. This road requested that revision be made in the cast-iron wheel design to afford more clearance between the hub and journal box when journals, journal bearings, boxes, wedges, etc. are approaching the extreme limits of wear.

In a comparison of hub clearance as between the cast-iron wheel and wrought-steel wheel it will be noticed the cast-iron wheel has $\frac{1}{16}$ in. more clearance with respect to the vertical reference line than the wrought-steel wheel, but if cast-iron wheels are mounted to the extreme spacing limits provided by the mounting and check gage with the gage contacting the wearing face of both flanges, this apparent additional hub clearance would be taken up in the mounting process. If, however, the wheels are mounted centrally on the axle and according to the recommended practice, with the mounting and check gage contacting the back of one flange and the wearing face of the opposite flange, the cast-iron wheel would have an advantage of $\frac{1}{16}$ in. with respect to hub clearance.

It is recognized that under certain conditions the journal box will contact the hub of the wheel, but there are so many contributing causes to this condition such as wheels not being mounted centrally on the axle, wheels mounted to the extreme spacing limits and general condition of the truck structure so that journal-bearing and box wear on one side are not supported by contact between the journal bearing and the axle collar on the opposite side, that revision of the wheel design does not seem the proper point of attack.

The present wheel design with offset arrangement of the hub and the rim which is accepted because of structural limitations does not represent a well balanced design and this condition should not be aggravated by any further increase in hub depression.

It is the opinion of the committee that if the conditions reported are existing to the extent that some definite corrective measures should be taken, a careful-detailed study should be made of the truck structure, the spacing of wheels as to their effect upon the undesirable condition and then the subject referred to the Car Construction Committee if changes in design to correct the condition are deemed desirable.

Removal of Cast-Iron Wheels for Worn Through Chill

Statements have been received from two individual car owners that they are having an unusual number of wheels removed from their cars on account of worn through chill and the thought

round gage, 3 were not worn through chill and did not take the out-of-round gage, but did take the remount limit gage.

At the other point where 59 wheels were inspected and broken, 55 wheels in this group were actually worn through chill, but only 3 would have been condemned by the out-of-round gage. The 4 wheels not worn through chill each took the out-of-round gage and could have been condemned under Symbol 73-R.

Summarizing, of the 90 wheels removed for worn through chill, 83 were found in this condition which indicates the inspectors condemning these wheels were a little over 93 per cent correct in their judgment of worn through chill condition. This inspection also definitely established that the out-of-round gage could not be taken as a correct means of indicating the condition of worn through chill.

Exhibit 1 of the 1937 report showed the roads reporting on the percentage of cast-iron wheels removed for different defects and that on Road A 19.47 per cent of the wheels were removed for worn through chill. Road B which is not a cast-iron wheel road showed only 3.72 per cent of the wheels removed for worn through chill, while Road C which is a cast-iron wheel road showed 27.08 per cent worn through chill. These figures were representative of conditions of wheels removed during the months of December, 1936, and January and February, 1937.

The committee is definitely of the opinion that the out-of-round gage is serving a good purpose from the standpoint of out-of-round condition but can not be recommended as a means of indicating worn through chill.

The committee has to date been unable to develop a definite gage for identifying the worn through chill defect and calls attention to the practice to be followed in identifying this defect shown in paragraph 102, page 117, of the Wheel and Axle Manual.

Measurement of Chill in Cast-Iron Wheels

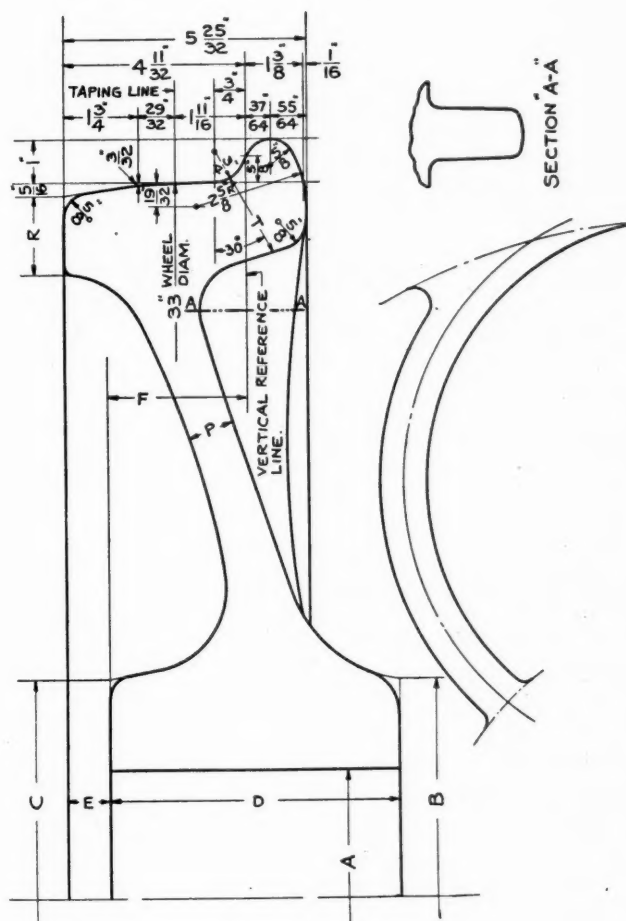
The Association of Manufacturers of Chilled Car Wheels furnished information to the committee relative to its development of the new method of measuring chill in cast-iron wheels. Until recently this measurement was based on the judgment of the inspector from a visual examination of the fracture, which leads to wide variations in interpretation. The association set forth the steps leading up to the present method which is based on a definite relationship between the combined carbon and hardness as read either by Sceleroscope, Brinell, or Rockwell machines. Under the new method, wear requirements are satisfied with a hardness of 363 Brinell or 55 Sceleroscope taken $\frac{1}{16}$ in. below the tread surface on the $3\frac{1}{2}$ -in. line. An upper limit is now being tentatively used which approximates the maximum passed under present methods of measurement in A. A. R. specifications. This calls for a Brinell hardness of 321 or a Sceleroscope hardness of 52 at a depth of $\frac{3}{4}$ in. below the tread surface. The association's statement concluded as follows:

"This method has gradually been introduced through our inspection department largely by careful education and detailed instructions on method of procedure and has now been effective for about twelve months, finally having been adopted by letter ballot of the members of the Association of Manufacturers of Chilled Car Wheels in connection with a general revision of specifications which are to be made effective June 1."

Multiple-Wear Wrought-Steel Wheels

Some service conditions to which wrought-carbon-steel wheels are subjected have developed within recent years which makes it necessary to give consideration to a heat-treated wheel in addition to those covered by A. A. R. Specification M-107. Service conditions have been imposing an increased burden upon wrought-steel wheels such as high wheel loads, high speed, braking requirements, as well as the design of the equipment and the condition of the track which it traverses.

Your committee has been collecting data relative to these special service requirements and the Technical Board of the Wrought Steel Wheel Industry has been diligently studying the problem and producing wheels of varying compositions and hardness characteristics that was felt were best adapted to the type of service to which they would be subjected. Sufficient data has been established to indicate that wheels representative of



Car Capacity	40-Ton	50-Ton	70-Ton
Nominal weight	700 lb.	750 lb.	825 lb.
Core size A	6 in.	6 1/2 in.	7 1/2 in.
Hub diameter, back B	10 1/4 in.	10 3/4 in.	11 1/2 in.
Hub diameter, front, C	10 1/4 in.	10 3/4 in.	11 1/2 in.
Length of hub, D	6 1/2 in.	6 3/4 in.	7 1/2 in.
Front hub recess, E	1 in.	1 in.	1 1/2 in.
Vert. ref. line to front hub, F	3 1/2 in.	3 1/2 in.	3 1/2 in.
Thickness of plate, P	1 in.	1 1/2 in.	1 1/2 in.
Thickness of rim, R	1 1/2 in.	1 1/2 in.	2 in.
Thickness thru throat, T	2 in.	2 1/2 in.	2 1/2 in.
Number of curved brackets	12	13	14

The Single-Plate Bracketed Chilled-Iron Wheel

has been advanced that this condition is due to placing the worn through chill defect back in the judgment class.

Your committee investigated 90 wheels removed from various cars for worn through chill condition, which wheels were inspected and subsequently broken to definitely develop the extent of the chill. Out of 31 wheels inspected at one point, 28 wheels were worn through chill, 13 of which did not take the out-of-

some type of heat treatment will be required to meet these various exacting service conditions and since there is no recognized practice prescribed for such wheels the committee, in conjunction with the Technical Board of the Wrought Steel Wheel Industry, are presenting for guidance a Tentative Specification for Heat-Treated Wrought-Carbon-Steel Wheels.

Of necessity this specification is of very general character and application, but it presents three different types of wheels classified as follows: Class A—High-speed service with severe braking conditions, but with moderate wheel loads; Class B—high-speed service with severe braking conditions and heavier wheel loads; Class C—service with high wheel loads and moderate braking conditions.

With this information available it will give the purchaser some basis upon which to make a selection. For instance, if trouble is being experienced with thermal cracking in high-speed service, and since thermal cracking is unquestionably connected with braking conditions, wheels according to Classes A or B, which have a comparatively low carbon content, would probably best meet this situation. Where trouble is being experienced on account of shelled treads which occurs frequently under locomotive tenders with heavy wheel loads, wheels corresponding to Grade C, which have a carbon range very similar to that of Specification M-107, but are heat treated to a minimum hardness of 321 Brinell will prove of value from the standpoint of resistance to shelled treads.

Suitable symbols stamped on the back face of the rim of each wheel identifies the class to which it belongs and provides against confusion in mating or identifying wheels for any particular service.

Interchange Rules

REMOVAL OF ONE-WEAR WROUGHT-STEEL

WHEELS FOR BUILT-UP TREAD

It has been reported that owners of cars equipped with one-wear wrought steel wheels are suffering an unwarranted loss on account of wheels removed on foreign lines with built-up tread, the handling line contending that in accordance with Rule 98-(i), one-wear wrought steel wheels are not to be turned and consequently allowing the owning road only scrap credit for the removed wheel.

There is no reason why wheels removed for built-up tread should not be restored for further service by turning or grinding; grinding being preferable, as in the turning operation the cut would have to be taken below the work hardened surface of the tread at the expense of a greater loss of service metal. It is recommended that Rule 98, Par. (i), be modified as recommended below:

Proposed Form: Rule 98 (i)—The condemnable defects for wrought steel wheels in Rules 79 to 83 apply also to the one-wear wrought-steel wheel. Charges and credits shall not be on a service metal basis. Prices new, secondhand and scrap, as per Items 194-C and 194-D, Rule 101, shall be used.

Wheels removed account of having built-up metal on tread shall have this metal removed, preferably by grinding, or by turning where thickness of rim will permit. Note under Items 270, Rule 107, provides labor charge of 1.4 hours for grinding or turning.

The one-wear wrought steel wheel is identified by marking "1-W" on back of flange near wheel number or manufacturer's name.

Reason: To clarify the intent that one-wear wrought-steel wheels may be ground or turned to remove built-up metal on tread. See Par. 37 and Figs. 45 to 49, inclusive, in Wheel and Axle Manual.

Proposed Revision of Interchange Rule 69

In connection with the recommendations to adopt the single-plate, bracketed, solid hub wheel as recommended practice instead of the present single-plate wheel without brackets, some provision should be made for mounting on the same axles, wheels of the same nominal weight of the following designs: Experimental AARX single-plate wheel, present standard single-plate wheel, experimental AARX single-plate wheel with bracket-

ed plate and solid hub, proposed recommended practice single-plate wheel with bracketed plate and solid hub.

In order to provide for such a procedure, suggestion is made that the fifth paragraph of Rule 69 be referred to the Arbitration Committee for revision substantially as follows:

Proposed Form: Cast-iron single-plate or single-plate bracketed solid-hub wheels varying in marked weight over 25 pounds must not be mounted on the same axle.

If the above change in Interchange Rule 69 is approved, the following revisions should be made in Interchange Rules 83 and 98:

Proposed Form—Rule 83 (1st par.): The application of double plate cast-iron wheels (regardless of date cast), of nominal weight less than 750 lb. to axles having journals 10 in. long or over, 700 lb. to axles having journals 9 in. long or over and 650 lb. to axles having journals 7 in. long or over; or cast-iron wheels without any weight cast thereon; or double plate cast-iron wheels cast prior to January 1, 1921; is prohibited.

Proposed Form—Rule 98, Sec. (c), Par. (5): Serviceable experimental cored hub wheels marked "A. A. R. X." when removed from service on account of defect in axle or mate wheel, shall be credited as scrap except when removed on account of Rule 32 condition in which event secondhand credit must be allowed for such undamaged wheel. Such wheels when subject to scrap credit shall be held and disposition requested from car owner. If car owner elects to have wheels returned, freight charges collect, shipping instructions must be furnished within thirty days from date of notification. No credit should be allowed for wheels so returned.

Interchange Rule 75

Considerable opposition has developed relative to interpretation given in last year's report regarding Rule 75. There was some contention that a change was made in Rule 75 without submitting the proposition to letter ballot. There were in fact no changes made in the rule. The Wheel Committee was asked for a definition as to what constituted a transverse crack extending into the throat of the flange. In an effort to define this reference more definitely, the committee suggested the interpretation note shown under Rule 75 and recommended a method of measurement.

It appears that some roads have used this interpretation to support the removing from service any wheels that show a slight checking in the throat of the flange and through this practice a hardship has been placed on roads whose wheels have been thus dealt with. To entirely remove the note without any further changes in Rule 75 leaves the reference to transverse cracks in the throat of the flange in the judgment defect class.

Cracks, regardless of their length, are considered as extending into the throat of the flange if they extend within $\frac{7}{8}$ in. of the flange as measured with gage shown in Fig. 1, Interchange Rules, seems to be unduly restrictive. Under a strict interpretation of this rule, cast-iron wheels which show a fine checker network of thermal cracks in the tread would be condemned if this network comes within $\frac{7}{8}$ in. of the flange. In this checker network, the cracks do not generally reach a length greater than $\frac{3}{4}$ in., and inasmuch as they do not have any marked depth at this length, wheels with such cracks are safe to run.

The committee, therefore, recommends that the Arbitration Committee give consideration to revising the first paragraph of Rule 75 as suggested below and the note be eliminated.

Proposed Form: Brake burn, cracks: Cast-iron wheels with one or more transverse cracks in the flange or in the tread if over $2\frac{3}{4}$ in. in length, or if more than 1 in. in length and extending within $\frac{5}{8}$ in. of flange as measured with gage shown in Fig. 1 and applied as shown in Fig. 1-A. See par. 107 and 108 and Figs. 83 and 85 in Wheel and Axle Manual.

If the foregoing recommendation is approved the third paragraph of Sec. (f)-3 of Passenger Car Rule 7 should be modified accordingly.

PROPOSED NEW RULE 75-A

Cast-iron wheels with a variety of tread defects, no one of which would condemn a wheel, are occasionally observed in service, the combination of defects being such that the wheel is not suitable for continued service.

Your committee has been requested to suggest a rule under which wheels unsuitable for service may be authoritatively removed because of such a combination of defects. In complying with this request it is recommended that the Arbitration Committee prepare a new Rule 75-A reading substantially as follows:

New Rule 75-A—Owner's Responsibility: Shelled out, flat spots, brake burn comby spots: Cast iron wheels having two or more defects not more than 3 in. apart and extending circumferentially on tread for a distance of 12 in. or more, as measured by the A. A. R. gage shown in Figure 76-A of the Wheel and Axle Manual, when such defects consist of any or all of the following: Shelled-out spots, one inch long or over but less than dimension shown in Rule 71; flat spots (except slid-flat spots), one in. long or over but less than dimension shown in Rule 71; brake burn comby spots, where metal has fallen out for a continuous circumferential length of $\frac{1}{2}$ in. or over but less than dimension shown in Rule 75.

REMOVAL OF WHEELS LOOSE ON AXLE

There has been brought to the attention of your committee a controversy developing between two roads, A and B, due to A removing from B's cars an unusual number of wheels account loose on axle. The position taken by A was there was indication these wheels were loose on account of oil seepage on the inside of the plate of the wheels.

No doubt every road at one time or other has been concerned about this proposition. In dismantling wheels showing oil seepage some will be found that are not loose on the axle, while the condition of other wheels fully justified their removal, and it is the opinion of the committee the roads can ill afford not to take every precaution against continuing in service wheels that may be loose on the axle even though an appreciably high percentage of wheels may prove secure when dismantled.

There is only one way to eliminate the removal of wheels on account of oil seepage and that is by better wheel-shop work through a higher degree of refinement in machining the axles, boring the wheels and in the fit tolerances observed. Improvement in these conditions, together with the use of the proper lubricant on the wheel and axle seats should insure wheel fits free from oil seepage.

Wheel-Shop Practices

The committee again wishes to emphasize the importance of wheel-shop work; that axles in their preparation have the wheel seat surface smooth machined and without taper, wheels be bored concentric with the tread and without taper and in the fitting of wheels and axles, the proper tolerances be observed to develop the desired mounting pressures when the A. A. R. recommended lubricant is used on the wheel seats.

In a recent investigation of wheel-shop practices covering inspection in 61 shops, only 44 per cent were rated as carrying on the work in conformity with standards prescribed in the Wheel and Axle Manual. The remaining 56 per cent were wholly or partially out of line with the practices recommended.

It is the opinion of your committee that if the Wheel and Axle Manual is put in the hands of all wheel-shop operators and sufficient support with regard to following the practices outlined is given by the higher mechanical officers, conditions such as observed in this inspection will be materially improved to the marked benefit of the operating road.

[The report included Appendix A giving tentative specifications for cast iron wheels and Appendix B for heat-treated multiple wear wrought carbon steel wheels. It also included the following notes on permissible wheel loads for wrought steel wheels, submitted by the Technical Board of the Wrought Steel Wheel Industries.—Editor]

Permissible Wheel Loads for Wrought Steel Wheels

The following notes are offered as a guide to the use of the various classes of wheels covered by the tentative specifications for heat treated wrought steel wheels, and by the standard A. A. R. specifications M-107. A general summary is presented first, and this is followed by more detailed consideration of the main factors which affect wheel performance. Many of these factors cannot be covered by exact specifications, and it is therefore not possible to give hard and fast rules for the service to which the

various classes of wheels should be assigned. It is hoped that the suggestions offered may be useful. As experience accumulates with the newer types of wheels, the situation can be clarified.

Until comparatively recent times standard operating conditions for which wheels to specifications M-107 were developed, were represented approximately by maximum speeds of not over 70 m.p.h., and a service braking ratio of 90 per cent. Under such conditions satisfactory results can generally be obtained with untreated wheels to Specifications M-107, provided that the static wheel load does not exceed 600 to 650 lb. per in. of wheel diameter. Heavier wheel loads have been carried in tender service by heat-treated wheels with chemical composition in accordance with Specifications M-107. These are Class C wheels of the tentative specifications of October 6, 1938. Experience has shown that with these wheels difficulty may be expected with wheel loads in excess of 800 lb. per in. of wheel diameter with fully loaded tenders, and that loads of 850 lb. per in. or over represent wrong design.

In addition to the Class C heat-treated wheels of the composition covered by Specifications M-107, the tentative specifications offer two other classes, A and B, covering heat treated wheels with modified carbon content. These classes have been developed to minimize difficulties encountered in modern trains with high speeds and rapid deceleration. The large amount of heat generated on wheel treads by brake-shoe friction under high-speed conditions has caused undue thermal cracking. The modification of the carbon content has been made to provide greater resistance to thermal cracking of wheel treads.

It is not practicable to evaluate exactly the factors which determine the service for which these wheels are adapted. It is believed that Class A will have greater resistance to thermal cracking, but is intended for lower wheel loads. Class B is suggested for somewhat higher wheel loads with severe conditions of speed and deceleration.

It is to be understood that for both Class A and Class B wheels used with speeds much over 70 miles an hour, the wheel load per in. of diameter should be less than is allowed for wheels in moderate speed service and should be progressively reduced as the speed is increased. Exact relations between load and speed cannot be set up in the present state of knowledge. Further experience with wheels of these tentative compositions should clarify the situation.

Following this general summary of the uses of the wheels covered by the Tentative Specifications, the factors which affect wheel performance are considered in greater detail. Five important factors are: static wheel load, maximum train speed, braking requirements, conditions of track and design and condition of equipment.

STATIC WHEEL LOAD

The static wheel load carried by the wheel in contact with the rail sets up compressive stresses in the tread of the wheel. Under normal conditions the area of contact between wheel and rail is small, and the compressive stress is high. The smaller the wheel diameter the smaller the area of contact for a given wheel load, and the greater the stress. Shelling is due to the break-down of the structure of the tread under repeated excessive compressive stresses.

SPEED

Speed has a doubly injurious effect on wheel life.

(a) An increase in speed increases the impact force with which the wheel strikes rail ends, cross-overs, switches, and other irregularities in the rails. The impact forces add to the stresses due to static loading and increase the tendency to failure by shelling.

(b) An increase in speed increases the kinetic energy in the train. When brakes are applied this kinetic energy is transformed to heat by the friction of the brake shoe on the tread of the wheel. Overheating of the tread by braking from higher speed leads to the development of thermal cracks.

BRAKING

During braking, heat is generated by friction at the surface of the wheel tread in contact with the brake shoe. The rate at which this heat is developed is directly proportional to the

wheel load, to the speed, and to the rate of deceleration. At high speeds even with normal deceleration the heat develops on the surface of the tread more rapidly than it can flow into the rim, and the tread metal rises to temperatures of 1,400 deg. F. and over. On emerging from beneath the brake shoe the tread metal is cooled rapidly by the flow of heat into the rim. This alternate rapid heating and cooling of the tread metal while the body of the rim remains at a moderate temperature, leads to the development of thermal cracks in the tread metal. It may also set up local stresses by producing quenched spots on the tread.

The rate at which heat is developed at the surface of contact between wheel tread and brake shoe is directly proportional to the speed, to the rate of deceleration, and to the load carried by the wheel. It, therefore, follows that if the rate of heat development is to be kept to a reasonable figure the wheel load must be kept down if speed and deceleration are to be increased.

It should be noted that as train speeds are increased it is natural to increase the rate of deceleration so as to avoid an undue increase in the distance required for stopping. Thus increase in train speeds frequently provides a double reason for using only moderate wheel loads. The rate of deceleration is directly proportional to the coefficient of friction between brake shoe and wheel and to the brake pressure ratio, which is the quotient obtained by dividing total brake shoe pressure on wheel by wheel load. As the coefficient of friction is beyond control an increase in rate of deceleration is obtained by increasing the brake pressure ratio. The increase in rate of deceleration thus produced increases, as has been seen, the rate at which heat is produced at the wheel tread.

CONDITION OF TRACK

With track in poor condition the impact of wheels against irregularities in the rail may be greater than impacts at the same speed on better track. No exact valuation can be placed on this condition, but it may be one of the reasons why wheel damage is greater on one division than another. Curves also affect the service obtainable from wheels.

DESIGN AND CONDITION OF EQUIPMENT

This is another factor which has a definite effect on wheel life, but which cannot be evaluated exactly.

It is known that in severe tender service the wheels on the front axle of the front truck develop more than their proportionate share of shelling, and in general the wheels in the front truck suffer more than the wheels in the rear truck. Similarly, wheels in some locomotive trailer trucks suffer an undue amount of damage under wheel loads which are not excessive for wheels in other positions.

The design and condition of the springs will affect the increase in load produced by impact. This effect will also be increased by any increase in the amount of unsprung weight carried by the wheels.

In conclusion, it is pointed out that intermediate factors, some of which have been noted, make it impossible to specify definite wheel loads which will be universally satisfactory. Loads low enough to avoid trouble under all conditions would be uneconomically low for many conditions. It is hoped that the railroads will study the results obtained in service by wheels to the Tentative Specifications and that with this experience they may be able to develop limiting wheel loads appropriate to their individual conditions.

The report was signed by H. W. Coddington (chairman), chief chemical and test engineer, Norfolk & Western; D. Wood (vice-chairman), engineer tests, Southern Pacific; E. E. Chapman, mechanical assistant, Atchison, Topeka & Santa Fe; W. R. Hedeman, engineer of tests, Baltimore & Ohio; J. Matthes, chief car inspector, Wabash; A. M. Johnsen, engineer tests, Pullman Company; E. C. Hardy, assistant engineer, New York Central; A. G. Hoppe, assistant mechanical engineer, Chicago, Milwaukee, St. Paul & Pacific; and H. H. Haupt, general superintendent motive power, Central region, Pennsylvania.

Discussion

A member from a southern road directed attention to paragraph (3b) of the tentative specifications M-403-39, in which

the specification says: "Drawn hubs will be accepted in a reasonable percentage of the total wheels presented for inspection . . ." The speaker suggested the deletion of the words "reasonable percentage" on the ground that it was not specific and that if any wheel involving such a condition were acceptable, why should not all wheels be acceptable. He suggested a more specific basis of rejection. At the close of the discussion the committee chairman explained that the reason for including this phrase in the report was to provide a rejection basis when individual conditions seemed to warrant such action. The first speaker referred to also raised some question as to the sulphur content of wheel iron, making the comment that if a maximum of 16 points of sulphur were acceptable in some instances, whereas the specifications call for 14 points, why should not the 16-point maximum be acceptable in all cases.

(The report was referred to letter ballot.)

Report on Brakes and Brake Equipment

During the past year your committee has been actively engaged in a number of very complex and much involved subjects, some of which will require considerable further study before satisfactory conclusions and recommendations can be determined. However, we submit the following report for your consideration.

Cleaning and Testing Type-AB Brakes

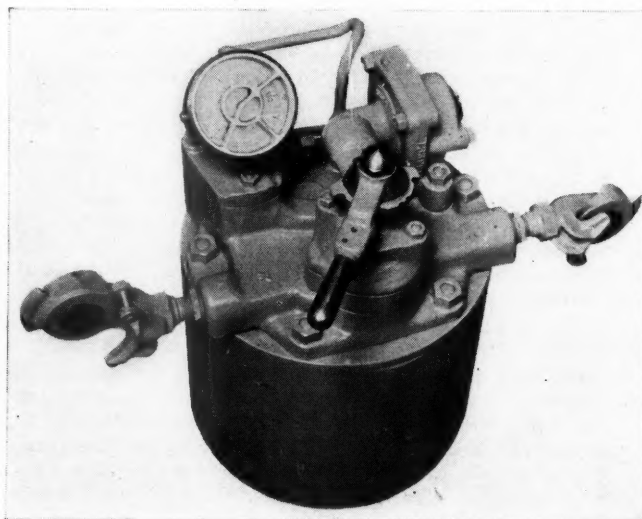
With the approval of the General Committee a short time ago, Sec. E of the Manual was revised, at which time substantial matter with reference to codes of tests and other items that are more or less subject to revision from time to time were deleted, inasmuch as they were a duplication of information contained in the respective air-brake manufacturers' pamphlets.

In this connection, the instructions covering the proper procedure to follow when cleaning and testing Type-AB brakes have been revised and were approved by the brake committee at its last meeting. These will appear in pamphlet form as published by the brake manufacturers and will be available for all those engaged in this work.

Although these instructions will appear under the sponsorship of the air-brake companies, they are issued with the committee's approval and will not be changed, modified, nor revised in any way without formal approval of the association.

Single-Car Test Devices and Test Codes

A few years ago some member roads complained that the present single-car test device with its code of tests would, under certain conditions, reject a Type-K triple valve that had successfully passed the 3-T triple-valve test-rack code of tests. A subcommittee confirmed these complaints and then considered



New Single-Car Testing Device

revisions to the code of tests, also the test device. With the assistance of the brake companies, a revised code of tests was prepared which, in practice, proved more or less inconvenient and difficult to carry out.

Inasmuch as the existing single-car test device could not be modified to remedy the conditions complained of, a further study revealed that a new design could be built that would be suitable for testing the brakes on any freight car of existing length and brake-pipe volume, as well as present passenger-car equipments.

The new design has been built and appropriate codes of tests prepared. It is our recommendation that this new design of single-car test device with its respective codes of tests be adopted as an Alternate to the present recommended practice device in order to obtain a wider experience with the new features it contains before offering such a device as a standard.

Modification of Freight Retaining Valve

In the committee's report last year reference was made to the present type of wasp excluder, also redesigning of the retaining valve to provide for larger passageways and additional protection.

The air-brake companies have submitted a further improved design of wasp excluder for application to existing retaining valves. Also a new design of retaining valve in which complete protection is provided against mud-wasps, together with complete protection against ice, sleet or other elements. However, some further consideration is necessary in connection with this new design and our recommendations with respect to it will be submitted in due course.

Since the last annual meeting complaints have been received of wheel troubles due to moisture entering the retaining valve, causing corrosion and stopping up the small relief port in the low-pressure cap. To remedy this, a molded rubber sleeve has been devised to fit over the low-pressure cap to protect the relief port.

The brake companies are now prepared to supply the latest design of wasp excluder and we recommend that it be accepted as an alternate to the one now generally used in order that a sufficiently wide application can be had definitely to determine its effectiveness in service.

We further recommend this design of molded rubber sleeve as a protection for the relief port so that a sufficient quantity may be applied to determine its effectiveness in service.

Standard and Lightweight Brake Beams

Since the No. 15 brake beam was adopted as standard, we have received several requests, principally from manufacturers, for approval of especially designed so-called lightweight beams for application to lightweight cars. These lightweight beams differ from the standard to the extent that most, if not all, their component parts are not interchangeable with it. In addition, they employ alloy materials.

The adoption of such a lightweight beam would involve a separate brake-beam specification and extensive revisions to the rules of interchange. In view of the fact that the only attractive feature in such a beam, and a very minor one, is a reduction in weight amounting to about 80 pounds per car set, any benefit in this direction would be more than offset by the inconvenience in effecting repairs in interchange and we are opposed to the introduction of any type of special design of lightweight beam unless all its component parts will interchange with the present standard.

The preparation of a standard No. 3 or No. 18 brake beam is well under way and our recommendations will be forthcoming in the very near future.

Brake-Head and Shoe Gages

In 1934, a price was established in the interchange rules covering the application of the standard A. A. R. brake-shoe key in repairs which was modified in 1935, resulting in a more general application of a properly dimensioned key. This has brought to light the fact that, when this standard key is driven down, it frequently damages the lug or loop of the brake shoe. To relieve this condition, we recommend two minor changes to the GO and NO-GO gage for the brake head shown as Fig. 3, page

B-10-1936 of the Manual changing dimension *D* from $\frac{1}{2}$ in. to $\frac{29}{64}$ in. and dimension *E* from $\frac{13}{32}$ in. to $\frac{25}{64}$ in., respectively.

Power Brakes for High Speed Passenger Trains

The development and introduction of various designs of streamlined light-weight trains employing different types of brake equipments seemed to warrant deferring committee action pending the results obtained in service with them. In addition, and more recently, considerable activity appears in the development of new and somewhat radical designs of brake arrangements of the disc, rotor and drum types, together with further improvements in valvular mechanisms.

From what we know, such new streamlined trains that are fitted with electro-pneumatic brakes, foundation brake gear of latest design, anti-wheel-sliding devices and effective means of sanding properly all wheels in the train simultaneously with the brake application, may be brought to a stop from a speed of 100 m.p.h. within the distance requested by the Bureau of Safety. As we understand it there are but few such trains in service; therefore, the problem pertains primarily to trains consisting wholly, or in part, of conventional units in high-speed train service.

Our committee is convinced that present conventional passenger trains cannot be brought to a stop in 1,200 ft. from 60 m.p.h. with the distance increasing at higher speeds in proportion to the square of the speed, or even within 3,600 ft. from a speed of 100 m.p.h.

Obviously, there are two basic problems involved—first, how can the necessary rate of retardation be obtained and, second, if and when it is obtained, will the rail-wheel adhesion be so encroached upon as to cause intolerable wheel sliding? If so, how can the latter be avoided without sacrificing the former? The answers to these basic problems are not so easily found as may at first appear. Physical limitations are very definitely before us in certain phases of this study; in others, only partial and minor assistance seems possible. We are, however, investigating every feature involved, including the mass of data compiled from the various and numerous high-speed train brake tests made from 1913 to date in the hope of realizing the objective set for us with the least possible disturbance and revision to existing fundamental brake schedules and arrangements. Whether this is practicable we cannot at this time say.

We expect to be in a position to report more definite progress in the near future. In the meantime, the foregoing is submitted for your information.

Manual Duplex Release Valve

It appears there are two features in the Type-AB release-valve stem about which complaints have been received. One is that the release-valve stem is too slender in design to withstand the conditions imposed upon it. The other is that when the release valve is pulled wide open from the short release rod and near the valve to bleed both the auxiliary and emergency reservoirs, dust, gravel, cinders, etc., are blown into the operator's face and eyes.

The air brake manufacturers have redesigned the stem, strengthening it very materially and at the same time have provided a deflector plate just below the release-valve opening which deflects the blast of air away from the operator immediately the air is released.

We are satisfied both these improvements are desirable, and it is our recommendation that this latest design be supplied on all new Type-AB valves as soon as the brake manufacturers can provide it and that it also be applied to existing Type-AB valves when release-valve stem renewals are made.

The question of permission to renew detail parts or portions of Type-AB equipment when the stenciling is in date and the brake operative was referred to our committee for advice. It is our unanimous opinion that, where it is necessary to give any attention to either portion of the Type-AB valve or the brake cylinder, the entire brake should be given attention in accordance with Interchange Rule 60.

Location of Angle Cocks on Long Freight Cars

It was brought to our attention that the present standard dimensions covering the location of angle cocks as shown on page

31—1928, Section E of the Manual was not satisfactory for long freight cars and that when located to these dimensions much trouble and inconvenience is occasioned around industrial and mill tracks. After investigating the matter we agree they are not satisfactory for such operating conditions and should be revised.

(The committee recommended changes in Fig. 1 on page 31 of Section E of the Manual, the principal revision lowering the angle cock $1\frac{1}{2}$ in. Otherwise the dimensions as now generally followed remain the same with maximum and minimum limits.—Editor.)

Where the angle cock is located at or near the horizontal minimum, interference may be experienced with the horizontal draft key, and this matter will be taken up with the Committee on Car Construction to see what can be done to avoid the necessity of relocating the brake pipe immediately back of the angle cock.

Lubrication of Air Brakes

During the past year serious consideration has been given to the question of satisfactory lubrication of car air-brake equipment, which includes lubricating oil for valve pistons, bushings, rings, etc., dry graphite for slide valves and seats, and grease for the brake cylinders.

The present standard rules of maintenance specify that the Type-AB valve pistons, rings, bushings, etc., must be lubricated with an approved kind of oil that the brake cylinder must be lubricated with a suitable brake-cylinder lubricant, but we have not yet specified what an approved oil or suitable brake-cylinder lubricant must be. The result is that many railroads are using various grades of oil and grease which are entirely unsatisfactory.

The number of Type-AB valves that are given attention as per Interchange Rule 60 before they have seen even two years' service provides ample evidence that the inferior kinds of lubricants used are primarily responsible. There is no doubt in our minds that, where satisfactory lubrication is practiced, the Type-AB brakes will give satisfactory service for at least three years but, unless approved lubricants are used, they cannot run their present allotted time.

The duration of service expected from these brakes demands special consideration in this respect and, when our recommendations are submitted, we shall, in all probability, ask for the adoption of strict regulations to ensure the economy anticipated by the adoption of these brakes as Standard.

Periodical Attention to Hand Brakes

It has been suggested by a member road that attention to geared hand brakes should be more definitely provided for in the Interchange Rules in order that they be attended to along with some other item given periodical attention.

The present rules for Maintenance of Brake and Train Air Signal Equipment, item 103, provides for the necessary attention to hand brakes on cars on shop or repair tracks with stencils "in date," but there is no regulation covering the same when cars are on shop or repair tracks for periodical attention to air brakes.

The joint subcommittee on geared hand brakes recommends the following paragraph be inserted as a new Sec. (n) to Interchange Rule 60: "(n) When car is on shop or repair track for air-brake cleaning and testing, the hand-brake mechanism and connections must be inspected, repaired and lubricated if necessary and tested to insure it is in suitable condition for safe and effective operation."

Maintenance of Train Air-Signal Equipment

The Bureau of Safety, Interstate Commerce Commission, has requested that steps be taken to incorporate in the rules for "Maintenance of Brake and Train Air Signal Equipment" definite requirement regarding the train air-signal equipment and that necessary improvements be made in the train air-signal equipment to insure its proper functioning. A subcommittee now has the matter under consideration.

Hose Clamp Bolts

Attention has been drawn to the practice of some roads when mounting hose square nuts are being used instead of hex nuts as

shown for the air hose on page 16, Sec. E of the Manual. This is intended to show only the location of the hose label and the correct mounting position of the bolting lugs or clamps. It is immaterial whether square or hex nuts are used.

In addition to the foregoing, the following items are among those under active consideration by our committee: Air-hose couplings and gages for air-hose couplings; maintenance of brake beams and their attachments; charging time limit for AB valves on repair tracks; corrosion of air-brake equipment; maintenance of passenger-car metallic connections and gaskets; reclamation of brake levers and inspection and tests of D-22 control valves.

We also wish to record our appreciation of the valued assistance given by the air brake companies on subjects jointly discussed with them; also, for their laboratory facilities in which considerable study was made.

The report was signed by W. H. Clegg (chairman), chief inspector air brakes and car heating equipment, Canadian National; T. L. Burton, air-brake engineer, New York Central; C. H. Rawlings, general air-brake instructor, Denver & Rio Grande Western; R. C. Burns, general foreman, Pennsylvania; L. S. Ayer, general air-brake inspector, Southern Pacific; J. P. Stewart, general supervisor air brakes, Missouri Pacific; R. E. Baker, general air-brake inspector, Boston & Maine; R. J. Waters, general air-brake inspector, Northern Pacific; J. A. Burke, supervisor air brakes, Atchison, Topeka & Santa Fe, and Otto Swan, air-brake inspector, Union Pacific.

Discussion

The committee chairman, after his presentation of the report, read a supplement to the 1939 report which was added with the idea of minimizing the damage to air-brake hose as a result of couplings pulling apart. This supplement read, in part, as follows: "In an effort to minimize this [damage] a minor change to the hose coupling and nipple has been suggested by the brake companies which the brake committee has approved. This change provides for distributing the stress in the air-hose fabric over an increased number of cords by increasing the radius of bearing for the inner surface of the hose when the air-hose couplings are pulled apart." This change in the dimensions of fittings affects only new fittings purchased and does not affect the status of existing fittings.

(The report was accepted and the recommendations referred to letter ballot.)

Report of Arbitration Committee

With the approval of the Operating-Transportation Division, no extension beyond January 1, 1940, is recommended for requirement in Paragraph (a-6) of Rule 3, prohibiting acceptance of cars in interchange bearing advertisements of any shipper, consignee or product. The wording of this paragraph has also been revised to harmonize with Operating-Transportation Circular No. T-55 dated April 19, 1939, making an exception of special cars of Mechanical Designation "L" and tank cars of Mechanical Designation "T."

The requirement in Paragraph (r-3) of Rule 3 which provides that hatch covers be secured with hinges on refrigerator cars, has been in the rules since August 1, 1930. No requests for extension of effective date beyond January 1, 1940, have been received. The committee feels that sufficient time has elapsed to permit compliance and that, in the interest of safety, no further extension of effective date is justified.

In accordance with proviso attached to approval of extension of effective date of Paragraph (t-17) of Rule 3 to August 1, 1939, specifying that plugs in heads of tank cars must be of solid type in order to comply with I. C. C. Specification No. 103, no further extension is recommended.

As result of complaints from various railroads and railroad clubs as to excessive defect carding for minor damage, including submission of hundreds of defect cards which had been outlawed without repairs having been made, an investigation and field study has been conducted under the direction of the committee. A revision of Rule 4 is recommended which it is felt will eliminate much of the excessive carding for minor damage, clarify the rule and set up more definite limits for the guidance of car inspectors.

A new interpretation is added to Rule 4 to provide that card-

ing company be granted the option of participating in joint inspection on cars damaged extensively by fire or flood and sent home bearing defect cards containing general statement of damage without specifying detail defective parts.

Upon recommendation by the Committee on Couplers and Draft Gears and with the concurrence of the Committee on Car Construction, Rule 20 is revised to provide for proper alignment of couplers and draft gears in connection with adjustment of coupler height.

The permissible re-light-weighting period is eliminated from Rule 30. Investigation developed that many foreign cars were being shipped for re-weighting immediately upon expiration of the 24-month permissible period. It is felt car owner should have the opportunity to re-weigh his own equipment prior to expiration of the 30-month period. As result of recommendation by your committee to the Operating-Transportation Division, this change has been submitted to letter ballot of that Division's members and approved.

Interpretation No. 9 to Rule 32 is modified to eliminate defect carding for minor damage caused by pulling with hook and cable.

The matter of establishing separate rates for and dates from which depreciation is to be computed for tanks, underframes and trucks of tank cars, for settlement purposes for destroyed cars, has been investigated by a joint subcommittee of representatives of the Arbitration and Tank Car Committees. A modification of Rule 112 is recommended to provide for separate depreciation of tanks of tank cars from date originally built, with no change in depreciation rates or limits, which it is felt affords a more equitable settlement basis. Provision is also incorporated to permit car owner to secure return of serviceable tanks from such cars, if desired.

The committee does not feel that any of the modifications included in its report necessitate submission to letter ballot.

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Attention is again directed to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange unless submitted in the form of Arbitration Cases as per Rule 123.

Freight-Car Rule 3

The committee recommends that effective dates for various requirements in the present rule, as listed below, now set at January 1, 1940, be extended to January 1, 1941:

Section (b), Paragraph (8)—Bottom rod and brake beam safety supports.

Section (b), Paragraph (9)—Braking power.

Section (b), Paragraph (10)—Brake shoes.

Section (c), Paragraph (11)—Couplers having 5-in. by 5-in. shanks.

Section (j), Paragraph (2)—Journal boxes, repacking of.

Section (t), Paragraph (3)—Welded side frames having T- or L-section compression or tension members.

Section (u), Paragraph (4)—Class E-3 cars not to be accepted from owners.

Also, that the effective date of Paragraph (7) of Section (b) of this rule, having reference to metal badge plate showing dimensions of brake levers standard to car, now set at January 1, 1940, be extended to January 1, 1942.

Reason: The present situation justifies these extensions.

The committee recommends that no further extension beyond August 1, 1939, be granted for effective date of requirement contained in Paragraph (17) of Section (t) of this rule, requiring that plugs in tanks of tank cars must be of the solid type, and that the wording be modified and revision included in the next supplement, as follows:

Proposed Form: (t-17) Tank cars (empty or loaded): Effective August 1, 1939, plugs in heads of tank cars must be of the solid type, etc.

Reason: Extension to present effective date was approved with proviso that no further extension would be granted due to the fact the provision was incorporated in the 1938 Code as a safety measure to comply with I. C. C. Specification No. 103. Requirement modified to apply only to plugs in heads of tank cars, as recommended by the Committee on Tank Cars.

The committee recommends that the last two sentences in Paragraph (4) of Section (a) of this rule be modified and revision included in the next supplement, to require reports to the A. A. R. by car owners semi-annually instead of quarterly.

Reason: It has been agreed that semi-annual reports will suffice for the purpose. Notice of change in this requirement was transmitted to all car owners on April 8, 1939, and no request was submitted for data covering the first quarter of 1939.

The committee recommends that Paragraph (3) of Section (s) of this rule be modified, effective August 1, 1939, as follows:

Proposed Form: (s-3) Stenciling: Date built new, month and year, or badge plate giving this information, required on all cars. Date rebuilt, in addition to date built new, month and year, or badge plate giving this information, required on all cars rebuilt on or after July 1, 1928. From owners: *In event tank and underframe of tank car are built at different times each must bear distinctive dates, the date on underframe to be date car was originally built.*

Reason: To harmonize with change in Paragraph A-5 of Rule 112.

The committee recommends that Paragraph (3) of Section (u) of this rule be modified as follows:

Proposed Form: (u-3) Underframe, etc.: No car of all-wood underframe equipped with metal draft arms extending 24 inches or more beyond center line of body bolster, will be accepted. *In interchange.*

Reason: Definition of Class E-4 car will be eliminated from Rule 112. It is felt sufficient time has elapsed to make this provision a general interchange requirement.

Rule 4

The committee recommends that Section (a) of this rule be modified and Interpretations Nos. 2 and 6 eliminated, as follows:

Proposed Form: Rule 4. (a) In the case of damage to a car for which the delivering line is responsible, such line must at the first available inspection point, attach defect card to cover. On cars extensively damaged which are forwarded home for repairs, the defect card, in addition to the defects noted, shall bear notation "Home for repairs." *This notation shall be applied only by the company issuing the defect card. No alterations may be made to defect card except by company issuing same or in cases of partial repairs as outlined in Rule 5. Defect cards cannot be repudiated.* If only a portion of the unfair usage damage is repaired, defect card for the remainder of such damage must be applied prior to release of car.

Reason: It is immaterial whether the partial repairs are made in shop or elsewhere and it should be clear that only the unrepaired portion must be carded. Last sentence modified and transferred to Paragraph (b-2) which deals with carding in interchange.

The committee recommends that Section (b) of this rule be modified as follows:

Proposed Form: (b) (1) Slight unfair usage damage that of itself does not require repairs to make car serviceable is not cardable, whether or not associated with other cardable damage. Items damaged to a lesser extent than specified in Sections (c) to (h), inclusive, are considered as slight damage within the meaning of this paragraph.

(2) If cars are offered in interchange with damage other than referred to in Paragraph (b-1), on which there is conclusive evidence of unfair usage, the receiving line shall require that defect card be attached to car, per Rules 2 and 14. Damage to or beyond extent specified in Sections (c) to (h), inclusive, will be classified as unfair usage for which defect card shall be issued in interchange.

Reason: It is felt slight damage, whether caused by fair or unfair usage, which does not require repairs to make car serviceable, should remain the responsibility of car owner regardless of any other cardable damage on car: To clarify the intent and set up definite limits for the guidance of car inspectors regardless of cause of damage.

The committee recommends that Section (c) of this rule be modified as follows:

Proposed Form: (c) House Cars, All-Steel and Outside Steel Frame:

(1) Metal posts, metal braces and metal sheets: Cut through

the thickness of the metal. *Post and brace flanges only*, cut through, will not be cardable.

(2) *Metal posts, metal braces and metal sheets*: Bent inwardly $1\frac{1}{2}$ inches or more. Bulb portion only of pressed-steel parts, or flanges only of structural shapes, when bent, regardless of extent, will not be cardable except where necessary to repair under conditions referred to in Paragraph (3).

(3) *Metal posts, metal braces and metal sheets*: Bent inwardly less than $1\frac{1}{2}$ inches, when necessary to repair for proper operation of door, or to comply with Safety Appliance requirements, or to restore alignment of bolt holes, rivet holes, or joints for welding.

Reason: To clarify the intent and harmonize with change in Paragraph (b-1). Metal slats omitted account practically none in use on house cars.

The committee recommends that a new sentence be added to first note following Section (d) of this rule and Interpretation No. 4 eliminated, as follows:

Proposed Form: Note.—It is understood that adjoining raked sheathing if not split or broken will not be cardable unless raked into tongue, except that on refrigerator cars sheathing boards raked to bottom of head but not into tongue will also be cardable if they adjoin (in consecutive order) the board raked into tongue, broken or split. *Sheathing damaged due to use of bar for closing side door is not cardable.*

Reason: To eliminate Interpretation No. 4.

The committee recommends that Section (f) of this rule be modified as follows:

Proposed Form: (f) Open-Top Cars.

(1) Metal posts, metal stakes, metal braces, metal top chord angles, or their substitutes: Bent inwardly four inches or more. Bulb portion only of pressed steel parts, or flanges only of structural shapes, when bent, regardless of extent, will not be cardable except where necessary to repair under conditions referred to in Paragraph (2).

(2) Metal posts, metal stakes, metal braces, metal top chord angles, or their substitutes: Bent inwardly less than four inches, but necessary to repair for proper operation of door or gate, or to comply with Safety Appliance requirements, or to restore alignment of bolt holes, rivet holes, or joints for welding.

(3) Metal side and end sheets: Holes through the thickness of the metal to an extent exceeding three inches measured in any direction, except when due to corrosion.

(4) (No change.)

(5) Metal top chord angles or their substitutes: Holes exceeding $1\frac{1}{2}$ inches measured in any direction.

(6) Flat car floors; metal or wood: Holes cut, exceeding three inches in any direction, except wood floors having holes not exceeding 3 by 12 inches each (latter dimension lengthwise of car) for center pin of pivoted load bolsters.

Note.—Holes in cars due to change in construction, or parts cut out to provide clearance for safety appliances, are not cardable.

Reason: To eliminate excessive defect carding for minor damage.

The committee recommends that Section (g) of this rule be modified as follows:

Proposed Form: (g) (1) All cars: Metal and sill, damaged in unfair usage, when removal from car is necessary for any repairs to car.

(2) All cars: Metal side sills, extending from bolster to end sill only, if flange or web is bent in excess of $2\frac{1}{2}$ inches.

(3) (No change.)

Reason: To clarify the intent and eliminate excess wording. Dimension for bent side sill modified to $2\frac{1}{2}$ inches, to harmonize with Rule 44.

The committee recommends that first paragraph of Section (h) of this rule be modified by omitting reference to present head-block anchorage.

Reason: To clarify the intent, as tank cars having head-block anchorage are no longer permitted in interchange service.

The committee recommends that third paragraph of Section (h) of this rule be eliminated.

Reason: Cars with defective safety appliances cannot be interchanged under Rule 2. This requirement relocated in Rule 33.

The committee recommends that a new note be added to Sec-

tion (1) of this rule and Interpretation No. 5 eliminated, as follows:

Proposed Form: (1) Note.—All associated defects should preferably be recorded on information card. However, if this is not done, the existence of such additional defects shall be established by joint inspection certificate executed at home shop as outlined in Section (k) of this rule within 90 days after first receipt of car by owner. In the event Rule 44 damage cannot be established as owner's defects, defect card shall be issued by the company issuing the information card for all associated defects as well as the Rule 44 damage.

Reason: For better reference.

The committee recommends that a new interpretation be added to this rule, to become effective August 1, 1939, to read as follows:

Q.—Where defect cards read "Car in flood" or "Superstructure damaged by fire," or other similar general statement of damage without specifying defective parts, whether or not containing notation "Home for repairs," is car owner required to have joint inspection made and apply for detailed defect cards per Section (k)?

A.—In such cases where whole or part of superstructure is involved through general statement of damage, car owner must accord railroad issuing defect card the opportunity of participating in joint inspection, whether or not a chief interchange inspector is employed in such inspection. If railroad issuing such defect card fails within 15 days from date of notification to avail itself of the opportunity of making joint inspection, then the joint inspection shall proceed in the manner prescribed in Section (k).

Reason: It is considered the provisions of Section (k) as to joint inspection can reasonably be extended to cars extensively damaged in flood or by fire and that carding company should have the option of participating if desired.

Rule 9

The committee recommends that third item in this rule with respect to information that must be specified on billing repair cards in connection with "Periodic Repacking of Journal Boxes," be modified as follows:

Proposed Form: Purpose for which car was shopped, if repacked prior to expiration of 15 months.

Reason: This information is unnecessary on cars repacked after the 15-months limit has expired.

The committee recommends that sixth item in this rule be modified as follows:

Proposed Form: Brake shoe keys, applied: 1934 A. A. R. Standard, or the symbol "K-34," must be shown to justify charge.

Reason: To clarify the intent.

Rule 17

The committee recommends that last column opposite Item No. 5 in the brake-beam substitution table appearing in Section (e) of this rule be modified, by the addition of a last clause, to read as follows:

Yes. Issue defect card for labor and material whether or not No. 2-plus beam is standard to car.

Reason: To clarify the intent and eliminate conflict with No. 5.

Rule 20

The committee recommends that second paragraph of this rule be modified as new Paragraphs (b) and (c), a new last Paragraph (f) and new Figures 1, 2, 3 and 4 added and interpretation eliminated, effective August 1, 1939, as follows:

Proposed Form: (b) When adjusting coupler heights under the provisions of Paragraph (a), the coupler should first be placed in proper alignment with draft gear. Shim as shown in Figures 1, 2, 3 or 4 [The drawings referred to are not included—EDITOR] of $\frac{1}{4}$ -inch thickness or more as required, may be applied for this purpose. If shim less than $\frac{1}{4}$ -inch thickness is required, re-alignment is unnecessary.

(c) After coupler has been placed in proper alignment by shimming carrier, if its height is not at least $\frac{1}{2}$ in. in excess of minimum dimensions specified in Paragraph (e), further adjustment

should be made at the truck springs, center plates or journal boxes.

(f) When couplers or draft gears are removed, replaced or renewed for or on account of repairs, and coupler height is within prescribed limits, the couplers and draft gears should be properly aligned as provided in Paragraph (b).

Reason: To provide for proper alignment of couplers and draft gears in connection with adjustment of coupler height, as recommended by the Committee on Couplers and Draft Gears and with the concurrence of the Committee on Car Construction.

Rule 23

The committee recommends that Section (g) of this rule be modified as follows:

Proposed Form: (g) When truck side frames, bolsters and knuckle-tail back wall of coupler heads are welded, the following record must be legibly stamped on the weld or immediately adjacent thereto by at least $\frac{3}{8}$ -in. steel stencils, in the following form:

(No other change.)

Reason: In some cases it is impractical to apply the stencil on the weld and stamping same immediately adjacent to the weld should suffice.

Rule 30

The committee recommends that Paragraph (1) of Section (B) of this rule be modified effective August 1, 1939, by eliminating the "wood" type of car and last column reading "Subsequent reweighing permissible after 24 months" be changed to 30 months.

Reason: To harmonize with change in Car Service Rule 11, as approved by letter ballot of the Operating-Transportation Division.

Rule 31

The committee recommends that Paragraph (b) of this rule be modified, effective August 1, 1939, as follows:

Proposed Form: (b) Where weight of car is changed 300 lb. or more (for refrigerator cars 500 lb. or more) account repairs of delivering company's defects, the expense of relight-weighting and re-marking will be charged to party responsible for such defects, unless car is due for re-weighing per Paragraph (1), Section (B) of Rule 30.

Reason: To harmonize with change in Rule 30.

Rule 32

The committee recommends that caption preceding this rule be modified as follows:

Proposed Form: Parts of Cars Which Justify Repairs If Owners Are Responsible, or Repairs or Carding If Delivering Company Is Responsible, Except As Otherwise Provided For In Rule 4.

Reason: To avoid conflict with Rule 4.

The committee recommends that Section (6) of this rule be modified as follows:

Proposed Form: (6) Removing parts or burning out parts of car to facilitate loading, unloading or for other purposes.

Reason: Account change in Rule 4 which covers.

The committee recommends that Interpretation No. 9 to this rule be modified, effective August 1, 1939, as follows:

Proposed Form: Inter. (9) Q.—Who is responsible for damage to car caused by pulling with hook and cable?

A.—Car owner, except where damage is such as to prevent side bearing from functioning or where body bolster or cross-tie is pulled entirely away from side sill.

Reason: To eliminate excessive defect carding for minor damage.

Rule 33

The committee recommends that Paragraph (3) of Section (b) of this rule be modified as follows:

Proposed Form: (3) Safety appliances on tank cars where damaged under any of the provisions of Rule 32, including safety railings, handholds, sill steps, ladder treads, and their brackets or supports, also running board supports when bent so that safety appliances are beyond clearance limits prescribed by I. C. C. Safety Appliance Acts.

Reason: Transferred from Rule 4.

Rule 64

The committee recommends that second paragraph of this rule be modified as follows:

Proposed Form: No charge shall be made for application of separate common nuts unless such nuts are fully tightened, and, where applied to journal-box bolts, column bolts, brake-hanger bolts, carrier-iron bolts, or coupler and draft-gear support bolts, such common nuts must be secured with nut lock or lock nut.

Reason: As a safety measure.

Rule 98

The committee recommends that reference to Rule 73-A and 83 be eliminated from Paragraph (4) of Section (c) of this rule.

Reason: To eliminate confusion in billing.

The committee recommends the addition of a new first note following Section (g) of this rule, and that present note be re-located as a new second note and modified by addition of new last clause, to read as follows:

Note 1.—Gage readings for multiple-wear wrought-steel wheels removed and applied, when the "after turning" measurements are predetermined by Standard wrought-steel wheel gage, must be reported at top of wheel-and-axle billing repair cards as per following example:

	(1)	(2)	(3)
(One wheel)	$2\frac{1}{4}$ in. — (minus)	$\frac{3}{4}$ in. — (minus)	$\frac{9}{16}$ in.
(Mate wheel)	$2\frac{1}{16}$ in. — (minus)	$\frac{3}{4}$ in. — (minus)	$\frac{3}{16}$ in.

to indicate for each wheel (1) tread thickness over all, (2) amount of metal between measuring point and condemning line and (3) amount of metal to be turned off as indicated by wrought-steel wheel-gage finger to produce full flange contour.

Note 2.—In the predetermination of service metal on wrought-steel wheels by use of the standard wrought-steel wheel gage, when neither wheel is scrap, the amount of metal required to be turned off the wheel suffering the greater amount of loss should apply equally to the mate wheel. When recording service metal of wrought-steel wheels on billing repair cards, the amount of service metal before and after turning, as indicated by steel-wheel gage, shall be shown for each wheel, with the understanding that the amount of service metal after turning shall be determined by deducting the greater amount of loss on either wheel from the amount of service metal on each wheel before turning.

Reason: To clarify the intent. It is also felt car owner is entitled to the gage readings to permit check of charges and credits.

The committee also recommends that the Wheels and Axles Billing Repair Card forms shown on pages 264 and 265 be modified to provide "Before Turning" and "After Turning" captions for wheels applied as well as removed.

Reason: Account change in Section (g) of Rule 98.

Rule 102

The committee recommends that last paragraph of this rule be modified as follows:

Proposed Form: In computing charges for paint, bolts, nails, nuts and forgings, if fractional weight of each entry on billing repair card is less than one half pound, it must be dropped; if one-half pound or more, charge the entire pound.

Reason: It is felt no charge should be made for this small amount of material.

Rule 111

The committee recommends that Item (8) of Paragraph (b) of Section 15 of this rule be modified as follows:

Proposed Form: (8) Vent protector. (Original application may be charged only when periodic cleaning is performed.)

Reason: Vent protectors should be applied in all cases when brakes receive periodic attention.

Rule 112

The committee recommends that Paragraph 5 of Section A of this rule be modified, effective August 1, 1939, as follows:

Proposed Form: (5) Age of car shall be determined by subtracting year and month in which car was originally built, or rebuilt, from year and month in which car was destroyed, which will give the life in years and months. No fractional part of a month shall be considered. The age of trucks shall be the same as that of the car body. *Where new or second-hand tank is applied to a tank car subsequent to original date car was built, depreciation on such tank shall be computed from date tank was built new, and depreciation on remainder of car shall be computed from date car was originally built.*

Reason: To afford equitable compensation in settlement for destroyed tank cars.

The committee recommends that reference to the Class E-4 type of car be eliminated from table of per pound prices in Section B of this rule, and note following this table modified, as follows:

Proposed Form: Note.—Cars with continuous metal draft sills of not less than 18 lb. per foot per member, without cover plates, where such continuous metal draft members are suitably tied to body bolster, are equivalent to Class E-3 for settlement purposes.

Also, that similar modification be made in Paragraph (4) and note following at bottom of page 239, and that all reference to the Class E-4 car be eliminated from Sections C, F, G and K of this rule.

Reason: Class E-4 cars have not been permitted in interchange from owners since January 1, 1937.

The committee recommends that first sentence of Section J of this rule be modified to include tanks of tank cars, effective August 1, 1939, to read as follows:

Section J.—Return of Serviceable Material to Car Owner:

1. When car owner is requested to furnish settlement value of a car under this rule, such owner when furnishing settlement value may instruct the handling line to return cast-steel truck side frames, metal truck and metal body bolsters, metal draft arms, friction draft gears, cast-steel yokes, metal ends and auto loading devices; also tanks, special castings and valves of tank cars.

Reason: To permit owner opportunity to recover such tanks, if desired.

Passenger-Car Rule 4

The committee recommends that the effective date of second paragraph of this rule, with reference to equipping all-steel or steel under-frame cars with cardboards or suitable receptacle for the accommodation of defect and joint-evidence cards, now set at January 1, 1940, be extended to January 1, 1941.

Reason: The present situation justifies this extension.

Passenger-Car Rule 8

The committee recommends that a new last sentence be added to Section (h) of this rule, which specifies delivering-line defects, as follows:

Proposed Form: (h) Burst or broken steam pipes and fittings, damaged steam valves, traps and parts of same (inside of car), when due to freezing, on cars equipped with a combined steam-heat cut-out and drain valve, also on cars equipped with hot-water system of heating, except when accompanied by porter furnished by car owner, who fails to bring to the attention of the handling line conditions that would cause any of the parts above mentioned to freeze. *The same responsibility applies to burst or broken water tanks, pipes and fittings (inside of car), when due to freezing.*

Reason: Handling line should properly protect cars from damage by freezing.

Passenger-Car Rule 13

The committee recommends that a new seventh item be added to Section (b) of this rule (no labor or material charge permitted), effective August 1, 1939, as follows:

Proposed Form: Lubricating and adjusting manually operated truck clasp-brake slack adjusters.

Reason: It is felt no charge should be permitted for this operation.

The report was signed by W. H. Flynn (chairman), general superintendent motive power and rolling stock, New York Central; J. P. Morris (vice-chairman), mechanical superintendent, Atchison, Topeka & Santa Fe; R. G. Bennett, general superintendent motive power, Pennsylvania; A. E. Smith, vice-president, Union Tank Car Company; J. A. Deppe, superintendent car department, Chicago, Milwaukee, St. Paul & Pacific; L. Richardson, mechanical assistant to vice-president and general manager, Boston & Maine; G. E. McCoy, assistant general superintendent car equipment, Canadian National, and M. F. Covert, general superintendent of equipment, General American Transportation Corporation.

(The report was adopted.)

Report on Labor and Material Prices

In order that the rules may currently provide an equitable basis for inter-road billing, the committee has continued the work of analyzing material, labor and new equipment costs in A. A. R. Interchange Rules 101, 107, 111 and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view of determining and recommending necessary changes to be made in the next supplement to the current code.

Freight Car Rule 101

All miscellaneous material prices in Rule 101 were rechecked as of March 1, 1939, quotations submitted by the purchasing agents of the ten selected railroads, representing 39 per cent of total freight-car ownership in the United States and Canada, indicating a rather mixed trend in material markets as indicated by detail recommendations for revisions shown under this rule.

New Item 114-A is added to provide charge for high-tensile steel castings when standard to car. Item 188-D modified to make clear that charge for high-tensile steel is permissible only providing such material is standard to car.

Item 121 modified to clarify the intent.

A new second note is added to Item 155-A, to indicate the intent that the additional charge for removal and replacement of monogram plates, sign plates or placard holders secured to doors, is proper in connection with door renewals.

Item 160 is modified to clarify the intent that allowance specified for hatch plug for refrigerator car does not include chain and chain bolt.

Item 182 is modified to provide a charge for ratchet wheel shims applied in order to correct loose or worn condition between ratchet wheels and square fit brake shafts, and thus avoid the additional expense that would be incurred if brake shaft was removed, repaired and replaced or renewed, as recommended by the Arbitration Committee and the Committee on Brakes and Brake Equipment.

A new second note is added to Item 194-A to definitely indicate the intent with respect to charges and credits for multiple-wear wrought-steel wheels originally over 33 in. in diameter, which have reached condemning limit for passenger service and been assigned to freight service.

The second sentence of the first note under the heading "Friction Draft Gears" is modified to clarify. One new conditionally approved type of draft gear, Waugh-Gould 410, has been added to Section I of the draft gear table, together with a note explaining just what "conditionally approved" signifies and that such gears are to have the same status as approved types insofar as substitutions, charges, credits and other provisions of the

Rules are concerned. Two new types of Peerless gears have been added to the non-approved section of the table and a clause inserted to indicate that prices listed for all four Peerless non-approved types of gears are exclusive of springs, spring rods, spring caps and cotters; the note following Item 277 being modified to harmonize.

Weights of brake hangers, brake levers and brake connection rods other than bottom rods, appearing in table of weights of miscellaneous items, have been increased 2 lb. each.

Interpretations Nos. 4 and 7 have been modified to clarify.

Rule 107

New Item 102-A added, to provide equitable allowance for renewal of journal box rivets in cases where side frames with Vulcan journal boxes are secured with rivets instead of bolts, in connection with removal, repair and replacement of journal box, truck side or wheels.

The second note following Item 48 modified, new third note added to Item 126 and a new note added to Item 296, to clarify the intent.

Rule 111

No modifications are recommended in this rule.

Rule 112

Recommendations are made in this rule respecting reproduction pound prices of new freight cars of all classes, in order that the supplement of August 1, 1939, may reflect 1938 costs in lieu of figures shown in the present code. New prices recommended are based on costs of 8,847 freight cars constructed during the year 1938.

Passenger Car Rule 21

In order to eliminate controversy and correspondence, a new note is added to Item 7 of this rule to indicate definitely where allowances for removal and replacement or renewal of bolts are applicable.

Items 20-B and 20-C are modified to clarify the intent that allowances specified for cleaning, oiling, testing and stenciling P. C. and U. C. control valves, include labor of making necessary repairs.

Item 20-K was modified to clarify the intent that this item does not apply to manually-operated slack adjusters.

Passenger Car Rule 22

Item 21 was modified to clarify the intent that same applies only to journal box lubrication and does not contemplate lubricating of pedestal, center plate and buffer stem oil cups, etc.

The notes following Item 41 have been numbered as Notes 1 and 2 and wording of Note 2 modified to clarify.

New Item 44 added to provide net charge for vestibule curtains applied complete.

As a result of questions raised in connection with present labor allowances for various rivet and jacking operations, the committee has arranged to conduct time studies on representative railroads in various sections of the country. If modifications are found necessary, revision will be made in the 1940 code.

It is the intent of the committee to investigate labor and material costs again in October and if sufficient change develops, necessary revision will be made and inserted in the rules effective January 1, 1940.

[The changes recommended in the existing rules are shown in detail in the report.—EDITOR.]

The report was signed by A. E. Calkins (chairman), superintendent of equipment, New York Central; A. E. Smith (vice-chairman), vice-president, Union Tank Car Company; J. D. Rezner, general car foreman, Chicago, Burlington & Quincy; P. Kass, superintendent car department, Chicago, Rock Island & Pacific; T. J. Boring, general foreman, M. C. B. clearing house, Pennsylvania; H. H. Boyd, assistant chief motive power and rolling stock, Canadian Pacific and A. H. Gaebler, superin-

tendent car department, General American Transportation Corporation.

(The report was adopted.)

Report on Tank Cars

During the past year the committee considered a total of 315 dockets and applications for approval of designs as follows: 157 covered designs, materials and construction of 2,176 new shipping containers for application to new cars or for replacement on existing cars of 17 classes. The five classes with the largest number of tanks were I. C. C.-106-A-500, 1202 tanks; I. C. C.-103, 324 tanks; I. C. C.-103-W (fusion-welded seams), 170 tanks; I. C. C.-105-A-300-W (fusion-welded seams), 100 tanks, and I. C. C.-105-A-300, 95 tanks.

Two applications covered five multiunit cars to be used for the transportation of 15 Class I. C. C.-106-A-500 one-ton containers each. Six applications covered 20 new underframes and trucks on which would be mounted existing tank-car tanks.

A total of 110 applications covered alterations in, additions to or conversions and reconditioning of 1,382 existing tank cars of 13 different classes.

Thirty-five applications requested approval of tank-car appurtenance designs, without reference to specific cars.

Specifications for Tank Cars

The committee has completed a proposed general revision of the Interstate Commerce Commission specifications for tanks to be mounted on or to form part of a car, referred to in our last report. This proposed general revision has been submitted to the commission for the necessary further handling.

Specifications for Fusion Welded Tank Car Tanks

The committee is at present engaged in a general revision of the specifications for fusion-welded tank car tanks, as submitted to the I. C. C. in 1934. When completed these revised proposed specifications will be submitted to the commission, along with reports covering service performed by existing fusion welded tanks in dangerous commodity service. The committee will, at the same time, in view of the satisfactory service performance of the tanks so fabricated, recommended the adoption by the commission of these proposed revised specifications.

Fusion-Welded Tank Car Tanks

Since the public hearings before the I. C. C., at Washington, D. C., on September 5, 6 and 7, 1934, on the matter of fusion-welded tank-car tanks the commission has authorized the construction of a total of 708 tank-car tanks, fabricated to conform to the proposed specifications then submitted, and their use in experimental service trials in transporting dangerous commodities.

To date 233 of these fusion-welded tanks have been constructed and placed in experimental service trials.

Two of the cars on which these tanks were mounted have been involved in wrecks resulting in considerable damage to the car structure, tank insulation and jacket. The fusion-welded tanks however suffered no apparent injury and after being subjected to hydrostatic tests and a thorough examination were returned to the service authorized by the commission's orders.

One fusion-welded tank failed as the result of a progressive fracture in the bottom sheet due to an internal defect impossible of detection by any ordinary method of inspection. This fracture, 3 in. long, including the initial internal defect in the sheet, was located on the transverse center line and extended circumferentially in the tank sheet, from the junction of the anchor-rivet-cover side wall with the tank shell, toward the sump. It was approximately 6 ft. from the single horizontal and a similar distance from the two circumferential fusion-welded seams of the middle course. The subcommittee appointed to investigate the failure of this tank were of the unanimous opinion it was not due to the use of fusion welding in the fabrication of the tank.

Service reports are regularly received covering all fusion-

welded tank-car tanks authorized for experimental trials. These indicate a satisfactory performance for the fusion-welded tanks now in service.

One riveted aluminum tank has been constructed and placed in experimental service trials transporting dangerous commodities on authority of the I. C. C.

The report was signed by G. S. Goodwin (chairman), mechanical engineer, Chicago, Rock Island & Pacific; F. A. Isaacson (vice-chairman), engineer car construction, Atchison, Topeka & Santa Fe; A. G. Trumbull, chief mechanical engineer, Chesapeake & Ohio; G. McCormick, general superintendent motive power, Southern Pacific; W. C. Lindner, chief car inspector, Pennsylvania; A. E. Smith, vice-president, Union Tank Car Company; G. A. Young, head, School of Mechanical Engineering, Purdue University; F. Zeleny, engineer of tests, Chicago, Burlington & Quincy; W. C. Steffa, transportation manager, Sinclair Refining Company; R. T. Baldwin, secretary, The Chlorine Institute, Inc.; H. J. Gronemeyer, supervisor car equipment, E. I. DuPont de Nemours & Co., Inc.; and R. W. Thomas, manager, Philgas department, Phillips Petroleum Company.

(The report was accepted.)

Report of Committee on Loading Rules

Since the last convention held at Atlantic City in 1937, your committee has held several meetings with the shippers, at which time recommendations for changes and additions to the loading rules were considered. In addition to this, several meetings were held by the committee as a whole, as well as the sub-committees, to consider and formulate rules based on recommendations submitted by the shippers and member carriers.

Considerable experimentation of trial loads embodying new forms of loading have been tried out, notable of which involved the steel and lumber industries. These loads have been followed to destination so as to determine their feasibility insofar as safety and practicability of such loadings, with very gratifying results.

The committee wishes to extend to the shippers and member carriers its sincere thanks for the splendid cooperation it has received in its work and is indebted to their representatives for their very able assistance.

As the result of these deliberations, your committee submits the following recommendations covering changes in the rules for your approval and submission to letter ballot for adoption by the Association.

General Rules

RULE 1

Change the next to the last sentence to read: "Shippers must confer with originating carriers regarding safe loading of material not covered in these rules, and exacting care must be exercised to see that the details specified in Rules 1 to 21, inclusive, are fully complied with."

Reason: To more clearly indicate what is desired.

RULE 3

Change to read as follows: "Clearance—Side Bearing—Loaded Cars.—There must be sufficient clearance between side bearings to permit free curvature of trucks and the average clearance per side bearing should not exceed $\frac{1}{4}$ in."

Reason: To reduce shopping of loaded cars for side-bearing adjustments in transit.

RULE 20

Change first sentence to read: "When loading material (metal or stone) which is short enough to drop through door openings in gondola cars, and which is not of such character as is intended to be unloaded through the drop door openings (stone larger than ballast, fluxing, and small stone, or metal other than borings, turnings, loose tin and sheet steel cuttings not more than $\frac{1}{8}$ in. thick), the door openings must be covered with

boards not less than 2 in. thick, secured to prevent displacement."
Reason: To retain boards in original position.

Instructions—Experimental Loads

Insert new paragraph between paragraphs 3 and 4 to read as follows: "Shipper, after having received authority for experimental shipments, will be furnished stickers worded as outlined below. He will affix one to bill of lading and attach another to be affixed to waybill by agent. This to insure proper handling of experimental load cards."

Reason: To insure proper handling of experimental load cards.

Sticker for Bill of Lading and Waybill

The Association of American Railroads, through the Committee on Loading Rules, has authorized the application of experimental load cards to Car..... These cards must be removed at destination by Car Inspector or Agent who must answer the questions on one of the cards and send it to the Secretary, Mechanical Division, Association of American Railroads.

[The rest of this report was devoted to recommendations covering proposed changes in details of various types of loading as illustrated in Figs. 2 to 209-A of the loading rules. New minimum requirements are given in detail for such commodities as plain steel plates, wire mesh or bar mats, rolled wire mesh, mounted car wheels and tractors with pneumatic tires.—Editor]

The report was signed by W. B. Moir (chairman), chief car inspector, Pennsylvania; C. J. Nelson (vice-chairman) superintendent interchange, Chicago Car Interchange Bureau; R. H. Dyer, general car inspector, Norfolk & Western; H. H. Golden, supervisor; A. R. A. Interchange and Accounting, Louisville & Nashville; H. S. Keppelman, superintendent car department, Reading; T. W. Carr, superintendent rolling stock, Pittsburgh & Lake Erie; and A. H. Keys, district master car builder, Baltimore & Ohio.

Discussion

In discussing this report C. J. Nelson, superintendent of interchange, Chicago Car Interchange Bureau, said that the drastic speeding up of freight trains has greatly increased the necessity of safe loading of commodities on open-top cars and that necessary rule revisions must be made from time to time to increase the safety of train operation. Formerly these revisions which increased the strength and, to some degree, the cost of loading were accepted freely by shippers, but, under present highly competitive conditions shippers will not agree to pay the increased cost unless they can be shown that it is absolutely necessary.

To illustrate this point, Mr. Nelson said that lumber loads present the greatest possibility for failure in transit and that the committee's recommendations for increased strength in loading methods could not be made to stand up with lumber shippers, because the committee lacked sufficient specific data to prove the urgency of the rule revisions. In an attempt to develop this factual information, the committee sent out questionnaires to 300 roads and received replies from only 72. Mr. Nelson said that unless better cooperation is secured from individual roads in providing this information, the work of the committee will be largely nullified.

Mr. Nelson also urged a closer adherence to the loading rules and a discontinuance of the practice now far too generally followed of accepting cars from shippers not loaded in accordance with the rules. In support of this statement Mr. Nelson cited the case of a large crane loaded on a flat car and secured in place with eight strands of $\frac{1}{8}$ -in. wire, instead of $1\frac{1}{4}$ -in. to $1\frac{1}{2}$ -in. anchor rods as recommended. Many other instances of rule violations could be mentioned.

An appeal was also made for more cooperation in properly filling out and returning the experimental-load cards, only 10 per cent of which now get back to the committee and some of these convey only a small part of the information requested.

Mr. Nelson said that shippers generally are entirely agreeable to go along with somewhat increased loading costs in the interests of greater safety when they can be convinced of the

real necessity for the increase. In closing his remarks, Mr. Nelson paid tribute to Secretary Hawthorne's invaluable help in maintaining favorable relations with shippers and convincing them that the committee is earnestly endeavoring to work in their interest, as well as that of the railroads, in promoting safe loading practices at minimum practicable expense.

(The report was accepted and referred to letter ballot.)

Report on Couplers and Draft Gears

Approved Draft Gears

During the past year a certificate of approval was issued for the Waugh-Gould Type 410 draft gear, bringing the total number of approved gears to eleven which are made by six different manufacturers. One of these manufacturers also has made application for approval of another type of gear. Tests have been completed and the report is being prepared.

The Waugh-Gould Type 410 gear is the first one that has received conditional approval. This signifies that the only information we have about it is based on the laboratory test, and that its performance in service will be watched until it is known that the conditional restrictions can be safely removed and a certificate of approval be granted, or that a certificate should be denied. It has been decided that conditionally approved gears should receive the same protection in interchange that is accorded approved gears, and the Interchange Rules have been so amended.

Because of indications that the manufacturers of draft gears will continue to offer new types for approval, consideration has been given to the problem of limiting the number of approved gears. It has been decided that a gear can remain conditionally approved for a period of not more than two years. At the end of this time the gear must either be withdrawn by the manufacturer or advanced to fully approved status and his former approved gear for the same pocket withdrawn.

Check Tests on Approved Draft Gears

During the year the laboratory work in connection with check tests of two each of seven different types of approved draft gears has been completed. These check tests disclosed some serious failures to maintain the standards of quality that were shown by original approval tests. Inasmuch as there is some evidence of the existence of extenuating circumstances in certain cases, the subcommittee believes it advisable to withhold publication of the results until the manufacturers involved have had full opportunity to examine the test specimens and to offer any explanations they may have to account for the discrepancies found. In any case where a satisfactory explanation cannot be given and adequate corrective measures have not been taken, the manufacturer will be required to file an application for a complete retest. One thing these check tests have emphasized is the necessity of making them more frequently in the future.

Draft-Gear Attachments and Installations

During the year the subcommittee has worked with the Car Construction Committee to improve the draft-gear attachment situation and has secured adoption of a revised location of the draft-gear support for A. A. R. standard cars to prevent the rear of the coupler yoke from being elevated when the draft gear is closed in pull. Tolerances for standard draft-gear attachments were worked out and adopted to remedy trouble caused by couplers being tight in housings. The Arbitration Committee has reported trouble experienced from mutilation of car center sills because of the indiscriminate substitution of approved draft gears for each other. This is because all approved gears do not use the same carry irons and filler pieces. At one time consideration was given to the possibility of requiring all approved gears to be so constructed that they would use the same carry irons, etc., but after studying the details involved it was decided that the advantages to be gained by such a provision were very definitely outweighed by the disadvantages. A special subcommittee has been appointed to work with the Arbitration

Committee to see if some other arrangement can be worked out to care for the situation.

Improvement in Draft Gears on Existing Cars

Interchange rules require approved draft gears on all cars built new after January 1, 1934; on all cars rebuilt after August 1, 1937, unless the underframe construction is such that an approved gear cannot be readily applied, in which case a gear acceptable to the sub-committee may be applied; and all new gears applied to any car after January 1, 1935, must be approved gears unless the pocket will not take an approved gear. These regulations will eventually result in there being only approved draft gears in service. The length of the transition period, in which we now are, will depend upon several factors the trend of which it is difficult to anticipate. Economic considerations prevent the scrapping of large numbers of non-approved gears which still have useful life left, regardless of the desirability of getting rid of such gears. In some cases economic necessity dictates that non-approved draft gears be repaired so as to further increase their useful life. It is hard to obtain agreement on the wisdom of doing this because of the different circumstances which attend individual cases. As an aid toward shortening the transition period, those non-approved gears, which it is most desirable to get rid of, have been classified as obsolete, and the incentive for maintaining them greatly reduced by permitting them to be charged for only on a scrap basis.

The policy has been pursued of giving full consideration to the wishes of both the manufacturer and the user before classifying any gear as obsolete, but the point has been reached where some definite measurement of obsolescence is needed. With this object in view, during the past year sub-committees of the Price Committee, the Arbitration Committee and the Coupler and Draft Gear Committee met in joint conference and recommended that any repaired non-approved draft gear that did not show at least 50 per cent of the required capacity for approved gears, when tested in the Association's laboratory, should be classified as obsolete. This recommendation has been approved by all of the committees involved, and the Draft Gear Sub-Committee is now making arrangements to secure representative samples of the gears in question so that they can be tested at the laboratory.

The Cardwell Type B gears and the Miner Types A-1 and A-IX have been added to the list of obsolete gears effective January 1, 1939. Agreement to this was secured without the necessity of making tests. There evidently is some misunderstanding of what the classification of a gear as obsolete means. When a gear is placed in the obsolete classification it does not mean that the owner must replace all such gears with other gears at the first opportunity.

On the contrary, under present rules, he can repair them and use them on his own cars without penalty. If, however, he applies these repaired gears to foreign cars he can charge only scrap price for them.

Another way in which the committee has endeavored to improve the draft-gear situation is by the proposal of a regulation which was adopted several years ago requiring car owners to inspect for draft-gear slack when cars were due for periodic cleaning of triple valves, and to drop the gears if more than 1½ in. free slack was found to exist. Complaint has been received of train accidents caused by pulling out coupler yokes, with accusation that cases of excessive free slack are being found.

This situation is being investigated further by the Committee and is being checked by the Mechanical Inspection Department of the A. A. R.

Draft Gears for Passenger Service

With the cooperation of a sub-committee of the Committee on Locomotive Construction, the Sub-Committee on Draft Gears has prepared during the year a proposed specification for draft gears for passenger car and locomotive tender service. This proposed specification is submitted herewith. It consists of a brief statement of the essential requirements together with a chart showing two compression and release curves, one for a gear designed for heavy service and one for a gear designed for light service. Submission is made at this time for the purpose

of inviting comments and criticism. [Note: The chart is not included with this abstract—EDITOR.]

General Characteristics and Limitations

The general characteristics and limitations set forth in the proposed specification are as follows:

(a) For the first $1\frac{1}{4}$ in. at least, the travel of a passenger gear should consist of essentially free spring action to smooth out the pulsating drawbar pull of the locomotive, while the latter part of the travel should be resisted by friction, or equally effective means, with sufficient capacity to absorb occasional heavy impacts.

(b) The initial compression of the gear should be about 3,000 lb., and under a compression of 60,000 lb. the travel should be not less than $1\frac{3}{8}$ in. nor more than $1\frac{3}{4}$ in.

(c) Depending upon conditions for individual applications, the total travel of the gear should be not less than $1\frac{3}{4}$ in. nor more than $2\frac{3}{4}$ in., with terminal resistance not to exceed 300,000 lb.

(d) The gear should be so designed that the spring resistance merges gradually into the friction resistance.

[The chairman of the Sub-Committee on Draft Gears is H. W. Faus.]

Swivel Butt Couplers

A member road during 1936 and 1937 built a group of hopper and gondola cars to which were applied A. A. R. Standard E Couplers in Grade B steel, A. A. R. vertical-plane swivel yokes in high-tensile steel and A. A. R. combination striking castings and front draft-gear stops in high-tensile steel. After some months of service it was noticed that these cars were showing a tendency to bulge the center sills in the region of the front draft-gear stop, right-hand side facing the car.

The Mechanical Committee of the Coupler Manufacturers was invited to cooperate with the railroad in making a study of the conditions that might be responsible for this damage. Several months of this study, including car-pushing tests, developed the following information:

(1) It is important that in the manufacture of vertical-plane swivel yokes the front and rear draft-gear bearing pads be made smooth and straight and at right angles with the longitudinal axis of the yoke;

(2) The vertical sides of the swivel yoke in high-tensile steel should be changed to increase the wearing area and reduce the lateral clearance between the front draft-gear stops to provide bearing areas to correspond with the Grade B steel design swivel yoke;

(3) The design of the front draft-gear stops in high-tensile steel should be improved by increasing the thickness of the vertical and horizontal ribs to provide wear surface equivalent to the Grade B steel design.

The changes recommended in the design of the vertical-plane swivel yoke in high-tensile steel to improve guiding between front draft lugs have been approved by the Coupler Committee.

The proposed changes in A. A. R. striking castings with integral draft lugs in high-tensile steel have been approved by the Coupler Committee and the matter referred to the Car Construction Committee for final action.

Type E Coupler Breakages

It has come to the attention of your Committee that there have been a number of breakages in the side wall of the coupler bodies due to the knuckle tail striking it. Examination of the broken coupler develops that this is due to the failure to open the knuckle when couplers are mated in classification yards. A number of breakages have also been found in the front face of the coupler and a review of these broken couplers shows it is the result of the coupler being struck a heavy blow on the guard arm by the opposing coupler. A thorough analysis of these two failures is being made in order to develop what, if any, changes in design are necessary.

Reclamation of Coupler Knuckles

It has been brought to the attention of the Coupler Committee that the $4\frac{7}{8}$ -in. nose-to-guard-arm spacing prescribed for re-

claimed knuckles as outlined in the committee's report of 1932 is inconsistent with the gaging limits prescribed in Rule 18.

The committee wishes to explain that this closer gaging limit for reclaimed knuckles was prescribed in order that in the process of reclaiming the knuckle, the maximum advantage from a gaging standpoint might be obtained, and any variation from the $4\frac{7}{8}$ -in. spacing simply means so much loss in service from the nose-to-guard-arm gaging standpoint.

Safe-Lock Couplers

It was mentioned in last year's report that a modified design of coupler intended to prevent vertical slipovers and also provide a support for a coupler pulled from an adjacent car had been suggested to your committee.

This attachment on the standard coupler would increase the weight about 10 lb. and the price a proportionate amount. While there is some question about this type of coupler making coupling within the various ranges of coupler heights, the most serious objection and the one that condemns it from an interchange standpoint is that it cannot be coupled with the standard tight-lock couplers.

The Coupler Manufacturers and your committee have been endeavoring to develop some means by which these protection features might be provided on standard equipment, but so far the best development is represented in a casting that is located under the coupler head and supported by the guard arm on one side and the knuckle pin on the opposite side. This construction requires a longer knuckle pin with a nutted bottom end. The arrangement increases the coupler weight about 26 lb. and in lots of 1,000 would cost approximately \$3.25 each including casting and special knuckle pin.

It is the opinion of the committee that the most practical and effective means for combating vertical slipovers is the more general use of 11-in. face knuckles in replacement of 9-in. face knuckles. The 11-in. face knuckles for Type E or D couplers cost only 30 cents more than the 9-in. face knuckle. It is the recommendation of the committee that the further production of 9-in. face knuckles for all types of couplers be discontinued and the patterns scrapped.

Specification for Type E Couplers in High-Tensile Steel

The increasing demand for Type E couplers in high-tensile steel is such that a specification covering this specialized product should be available for guidance of roads desiring high-tensile steel couplers.

Instead of preparing a separate specification covering Type E couplers in high-tensile steel, it was decided that Specification M-204, which covers the Type E coupler in Grade B steel, could be modified to include the couplers in high-tensile steel. The specification has been prepared along this line and has met the approval of the Committee on Specifications for Material.

Tight-Lock Couplers

In the 1938 report, mention was made of the attention the Coupler Manufacturers were giving to certain details of refinement in the design and construction of tight-lock couplers. This study has been further advanced to the point where it now includes:

(1) An increase in the amount of surface of the contour to be machined.

(2) A revision of the location and size of the knuckle-pin hole in both bar and knuckle to provide for boring holes and the holes in the bar and knuckle to be concentric with each other.

(3) An improved anti-creep feature for the lock which definitely prevents the lock creeping in service and provides also for improved coupler operation.

(4) The gathering wing pocket on the knuckle side of coupler head has been revised to its original design as there no longer exists the necessity for accommodating the tight-lock coupler to the control-slack coupler. This will provide more clearance for steam lines and improve the interlocking conditions.

These changes have been incorporated in the equipment and couplers manufactured subsequent to January 1, 1939, incorporate these improvements.

The principle of the tight-lock coupler is sufficiently different from the Standard E type coupler that it is desirable to provide instructions concerning the handling and maintenance of the tight-lock coupler.

These instructions were included in Appendix A of the report and will also be issued as a separate circular.

Attention is called to these instructions in which are shown three types of coupler operating attachments that have been designed as satisfactory for use with the tight-lock coupler to suit the three different general types of car construction.

It is recommended that these three designs of uncoupling rods be submitted to letter ballot for adoption as recommended practice.

Laboratory Tests of A.A.R. Tight-Lock Coupler, Yoke and Radial Connection

The General Committee of the Mechanical Division, early this year appointed a special committee to develop specifications for design of new passenger equipment cars for interchange service. This special committee at a meeting held in Chicago on January 17, 1939, requested the Mechanical Committee of the Coupler Manufacturers to cooperate with the A.A.R. Committee on Couplers and Draft Gears in the development of a suitable design of shank and attachments for the A.A.R. tight-lock coupler. Further, that laboratory tests be made on the design agreed upon to indicate the strength of the arrangement in tension, compression and in vertical and lateral bending. The special committee suggested that the coupler shank be designed on the basis of 900,000 lb. yield strength as a column under compression. Also, that the anti-telescoping strength of two complete couplers coupled together be not less than 100,000 lb.

During joint meetings of the Mechanical Committee of the Coupler Manufacturers and the A.A.R. Committee on Couplers and Draft Gears held in Cleveland, on January 31 and February 1, 2, and 21, 1939, a design of shank, yoke and radial connection for the A.A.R. tight-lock coupler was agreed upon and a schedule of tests arranged to determine the strength of the unit under various loading conditions which might be encountered in service.

All castings for these tests were manufactured by the National Malleable and Steel Castings Company. All tests were conducted by the Mechanical Committee of the Coupler Manufacturers under the supervision of the A.A.R. Committee on Couplers and Draft Gears. The tests were started on March 15 and completed April 7, 1939.

Tests Numbers 1, 2, 4, 5 and 6 were conducted in a 1,000,000-lb. Olsen testing machine in the laboratory of the National Malleable and Steel Castings Company, Sharon, Pa. Test No. 3 was conducted in a 1,000,000-lb. Riehle testing machine in the laboratory of the American Steel Foundries, Alliance, Ohio. Test No. 7 was conducted in the Pennsylvania's 27,000-lb. drop test machine located at Altoona, Pa.

The results of these tests have not only exceeded by a considerable margin the requirements of the Passenger Car Specification for coupler strength, but have demonstrated that the results are consistent with the results of previous static tension and static compression tests on complete couplers made of high-tensile steel in the Standard "E" Coupler design.

The Committee recommends that this design of tight-lock coupler and attachments be submitted to the association for adoption as standard.

Secondhand Coupler Specifications

Item 3. Marking in the specification for secondhand couplers has been given several interpretations and as a result there has been some confusion as to just what markings secondhand couplers reclaimed by welding should carry.

This item in the specifications for secondhand couplers has also been somewhat confused with the marking called for in Rule 23 where couplers are welded in the knuckle side wall.

In order to clarify Item 3 of the specifications it is recommended that the following change be made:

Proposed Form: Item 3. Marking—Secondhand couplers having body reclaimed by welding must be stamped with the railroad's initials, followed by the date reclaimed, in the location shown in Figure 1, page 5, of the pamphlet. (This stenciling on secondhand couplers should not be confused with the mark-

ing required by Rule 23, Section V(g) on couplers welded in the knuckle side wall.)

There is a correction to be made in the secondhand coupler specifications relating to the number identification of knuckle reclamation gages Process No. 2. Gage No. 25610-2 should be numbered 25610-1, correspondingly Gage 25610-1 should be changed to 25610-2.

The secondhand coupler specifications provide for guard arm distortion gage 25005—designed to measure guard arm distortion on No. 10 contours. As there appears to be a demand for a similar gage applicable to couplers having No. 10-A contours a new gage No. 25005-A has been designed. This gage is so constructed that one side is utilized for gaging the guard arm distortion on the No. 10 contour couplers while the opposite side applies to the No. 10-A contours. This gage is recommended for adoption as recommended practice.

Standard Catalogue Numbers for Couplers and Parts

The Mechanical Committee of the Coupler Manufacturers has been giving attention to the preparation of standard catalogue numbers that may be used by the several manufacturers for identifying parts of the Type D coupler, the Standard E coupler and tight lock coupler, including various attachments. The Committee has been advised that this work is now completed, and this standard system of identifying couplers and parts by the Coupler Manufacturers will become effective July 1, 1939. It is recommended that this information be included in an A. A. R. circular to be issued to the members.

The report as a whole was signed by R. L. Kleine (chairman), assistant chief motive power—car, Pennsylvania System; H. W. Coddington (vice-chairman), chief chemical and test engineer, Norfolk & Western; C. J. Scudder, chief of motive power, Delaware, Lackawanna & Western; L. P. Michael, chief mechanical engineer, Chicago & North Western; J. P. Morris, mechanical superintendent, Atchison, Topeka & Santa Fe, and H. W. Faus, engineer motive power, New York Central System.

In submitting this report the chairman changed the committee recommendations with respect to the design of the tight-lock coupler and attachments in that this design be submitted to the association for adoption as recommended practice, instead of as standard.

(The report was accepted and the recommendations referred to letter ballot.)

Report on Car Construction

During 1938 the full Car Construction Committee, in cooperation with the Freight Car Design Committee of the American Railway Car Institute, undertook an economic study of light-weight box-car designs in line with the program of 1932 which consists of items (a) to (f) inclusive, as covered by Appendix A to Circular DV-768 for that year.

It was agreed that this study would have for its basis the design of a steel-sheathed wood-lined box car having clear inside dimensions of 9 ft. 2 in. wide, 10 ft. high at eaves and 40 ft. 6 in. long as shown by general arrangement Plate 1500, Appendix A to the Annual Report of 1937, Circular DV-920.

It was further proposed to have developed through cooperative efforts of the car builders, the railroads and the specialty manufacturers, designs of the following types of construction: (1) Lightened design in carbon-steel riveted construction; (2) Combination of carbon-steel riveted and welded construction; (3) Alloy steel with combination of welding and riveting; (4) Alloy steel largely of welded construction. This study has been actively followed and tentative designs have been submitted but a considerable amount of work still remains to be done before a general statement of the results may be submitted.

This analysis relates to car body design and construction but, in order that relative weight and cost information may be presented on a comparable basis for the complete car in each case, trucks of the conventional spring-plank design of Grade B steel with nominal weight chilled-iron wheels are to be included at weight per car set of 15,600 lb., as reported in Appendix A to Circular DV-920.

As information, it may be stated at this time that when setting up the carbon-steel riveted-construction body complete as one

hundred per cent, tentative results show the following body weight comparison possibilities: Design (1) 94 per cent; (2) 89 per cent; (3) 79 per cent; (4) 76 per cent.

On the question of initial cost the indications are that in reasonable lots, say 1,000 cars or more, the costs per unit complete with conventional trucks would be about the same for each of the designs listed.

It should be recalled, however, that although the smaller car body for the A. A. R. standard design of 1932 having clear inside dimensions 8 ft. 9½ in. wide, 9 ft. 4 in. high at eaves and 40 ft. 6 in. long, weighed about 3,000 lb. less than the then best steel-sheathed designs of equivalent size, the results of subsequent extensometer, deflectometer and also impact tests conducted under collision conditions showed that over-all strength of the new design had been increased some 20 per cent or more over the strength of the two steel-sheathed designs tested in the same manner at that time.

The question of desirable or necessary strength for the light-weight designs has not as yet been gone into in detail, but it is the intention of the committee to investigate this feature further with the A. R. C. I. Committee. This is an important consideration because of its possible effect on anticipated service life

New House Type and Hopper Cars Ordered May 5, 1938, to April 30, 1939

Design	No. of cars	Per cent of total
A. A. R. throughout or conforming thereto, including light-weight alloy steel to A. A. R. base dimensions, hoppers with inside dimensions to meet specific conditions.....	11,875	91.98
A. A. R. except 26¾ in. center-plate height.....	35	.27
Not A. A. R. except inside dimensions	1,000	7.75
Total	12,910	100.00

[Note: Of a total of 18,731 cars, including freight, refrigerator, gondola, flat, stock, and special-type cars not listed in the table, 16,696 cars or 89.14 per cent have the standard center-plate height of 25¾ in., and 2,035 cars or 10.86 per cent have a 26¾-in. center-plate height.]

and ultimate cost, and further study of the matter might conceivably alter the weight percentages here given and possibly also the relative costs.

Standard Hopper Cars

As a result of further experience gained in the construction and service of the A. A. R. standard self-clearing hopper cars with particular reference to the cars built with the coped-out center sills, certain detail changes to improve the designs were found necessary or desirable.

These consisted principally in the application of a continuous reinforcing angle on each inside bottom edge of the coped-out portion of the "Z" bar center sills to replace the sectional angles formerly shown.

These changes result in a consequent reduction in the number of rivets for the reinforcing angles and the revisions have the joint approval of the A. R. C. I. and the Car Construction Committee.

[The report was signed by T. P. Irving.]

Center-Sill Section for Use with the 25¾ In. Center-Plate Height

In connection with the production of center-sill section Z-26, the steel manufacturers have had difficulty and to reduce materially the tendency of cracking at the corners they propose the following:

"The upper outer radius between vertical web and horizontal projecting long flange of the Z-bar should have outside corner radius of ⅛ in."

This recommendation has the approval of the American Railway Car Institute Committee on Freight Car Design and also the approval of the Car Construction Committee. It will have no appreciable effect on the properties of the section and will also materially reduce the liability of the edge becoming nicked with the resultant possibility of development of cracks.

A. A. R. drawing 525-C has been revised to cover and has been included in the revision of the Supplement to the Manual. [This report was signed by T. P. Irving.]

Report of Joint Sub-Committee on Box-Car Floors

The question of damage to box and automobile box car floors, due to heavy concentrated loads imposed by power trucks when handling steel sheets, ingots, bars and similar lading, has been discussed during previous annual meetings of the Mechanical Division and has also been the subject of correspondence between the Operating-Transportation Division and the Committee on Car Construction.

Some time ago a joint Sub-Committee of the Car Construction Committee and the Design Committee of the A. R. C. I. was appointed to study this matter.

After consideration by this committee and the full Committee on Car Construction, it was decided that in view of the information now available and the experience of certain railroads, suitable designs of heavier floors could be developed to cover the situation without conducting special loading tests.

Sketches are being prepared and within the next month proposed floor construction will be sent out under special letter ballot circular.

[The chairmen of the joint subcommittee are T. P. Irving for the Car Construction Committee and W. H. Mussey for the American Railway Car Institute.]

Trucks for High-Speed Freight Service

In the report for 1937 a brief statement was given under heading Light Weight and Less Expensive Trucks for Load-Carrying Cars Used in Regular Passenger Service, Including High-Speed Operation.

This related to a then proposed program of tests for the purpose of obtaining information for use in the development of a lighter and less expensive truck than the conventional equalized swing-motion passenger truck for use under certain types of load-carrying cars operated at the head ends of passenger trains in fast through service and also perhaps applicable to some extent to locomotive tenders. Also, to determine specifically the value first of swing motion, and second, of separate equalization for such service.

Subsequently the instructions to the committee were changed with request for investigation and tests of trucks for high-speed freight service to meet the changing demands of such operations. This matter has been actively progressed under the immediate direction of the mechanical engineer of the division and the tests will be started about June 1, 1939.

Joint Sub-Committee on Side Frames and Bolsters

During the past year no new design of cast-steel side frames of either alloy steel or Grade B carbon steel was submitted to the sub-committee for consideration. The pressed and welded rolled steel side frame has, as stated in the Report of 1938, successfully passed the static tests but as the frame has not yet passed the required dynamic tests, approval has been withheld. Applications pending include side frames for a 40-ton and a 70-ton truck, each spring-plankless and of carbon steel, one 50-ton alloy steel and one 50-ton pressed and welded rolled-steel design, each, for a truck with spring plank.

Reference was made in the 1937 and 1938 reports of this sub-committee to the new designs of pressed and welded rolled-steel side frames and bolsters for 50-ton cars submitted for approval by the United States Steel Corporation. The first design of 50-ton capacity bolster met successfully the requirements of A. A. R. specification for Grade B carbon-steel bolsters and was approved in 1937 for application to cars in interchange, not exceeding 1,000 car sets.

Recently an additional design of 50-ton capacity and two designs of 70-ton capacity bolsters were submitted by the United States Steel Corporation, samples submitted successfully passed the specification requirements of A. A. R. specification for Grade B carbon-steel bolsters and were approved for application to cars in interchange, to the extent of not more than 1,000 car sets of each design. In addition to these bolster designs, one

carbon-steel 40-ton spring-plankless design with the Barber stabilized truck was approved.

[H. W. Faus is the chairman of this joint subcommittee.]

Definitions and Designating Letters for Freight and Passenger Cars

During the past year the committee has passed upon a number of requests from car owners for designating letters for new types of passenger and freight cars. After reviewing these requests they have been presented to the membership for approval by letter ballot.

The committee recommended the following new symbols and definitions:

"DE"—Dining Car for use of patrons, fitted with tables and chairs or seats, but without a kitchen.

"DK"—Dormitory Kitchen Car. One portion provided with a kitchen for preparing food for patrons, the other portion equipped as a dormitory for the use of the crew.

"DLC"—Lunch Counter Car. One portion provided with a kitchen for preparing food for patrons, the other portion equipped with a lunch counter.

"DCL"—Lunch Counter Lounge. A car fitted with a lunch counter and kitchen, the other portion equipped with seats or movable chairs. The latter end may be designed as a lounge, observation room or car may be equipped with an observation platform.

[The chairman of this subcommittee is G. S. Goodwin.]

Other Items

During the current year, in accordance with the provisions of the first paragraph of Interchange Rule 3, the committee reviewed and approved seven designs of chlorine container cars, from which thirteen cars were built; one design of lightweight steel-sheathed refrigerator car, from which one was built; one design of well type car, from which six were built; one special design of flat car, from which two were built; one design of tank box car for liquid oxygen, from which one was built; one design of lightweight-steel welded box car, from which fifty were built; one design of pulp-wood rack car, from which fifty were built; one design of lightweight side-dump car, and one design of roofed hopper, from which thirty-five were built. One underframe design for a 50-ton box car was also reviewed.

The subcommittee on revisions to the Manual and Supplement to the Manual made a review of portions of Sections B, E, and L, the entire sections of C and D of the Manual, and the complete Supplement to the Manual. Changes were made, and the revised and new sheets are available and will be issued in the regular manner. The sub-committee suggests that pages which have been eliminated and replaced, be preserved as a matter of record and for reference purposes.

The sub-committee on revision of Interchange Rule 86 for adjustment of the railroad limit capacity to compensate for various weight wheels now in general use is of the opinion that although the proposed note formulated for addition to Interchange Rule 86 would accomplish the immediate objective sought, it would be necessary before placing the revised rule in effect to adjust upward the capacities of certain axles. It has been considered advisable to await the outcome of fatigue tests, now being made under the direction of the mechanical engineer with full size axles, so as to have available more definite information with respect to the points of highest stresses in such axles for comparison with changes in stresses involved in the adjustment of axle capacities. It is apparent that the fatigue-test results will be of considerable aid to the sub-committee in deciding the extent, if any, to which changes in capacities of present standard axles might ultimately be recommended.

It is recommended that the item of definitions and designating letters be submitted to letter ballot of the members.

The report was signed by P. W. Kiefer (chairman), chief engineer motive power and rolling stock, New York Central System; T. P. Irving (vice-chairman), engineer car construction, Chesapeake & Ohio; W. A. Newman, chief mechanical engineer, Canadian Pacific; F. J. Jumper, general mechanical engineer, Union Pacific System; J. McMullen, superintendent car department, Erie; F. A. Isaacson, engineer car construction, Atchison, Topeka & Santa Fe; G. S. Goodwin, mechanical engi-

neer, Chicago, Rock Island & Pacific; E. B. Dailey, engineer car construction, Southern Pacific Company; J. T. Soderberg, general foreman, Pennsylvania; T. M. Cannon, engineer car construction, Chicago, Milwaukee, St. Paul & Pacific, and H. L. Holland, assistant engineer, Baltimore & Ohio.

Discussion

One member directed the attention of the committee to the fact that on the 40- and 50-ton steel-sheathed box cars the end lining is applied vertically and the stringers horizontally so that when these cars are loaded with grain the lading gets down behind the end lining and lies on the horizontal stringers. It was suggested that the stringers be placed vertically in the car and that the end lining be laid horizontally so that the lading will fall down to the floor, thereby minimizing the possibilities of the car becoming infested with vermin.

(The report was accepted and referred to letter ballot.)

Locomotive Construction

Design of Fundamental Parts of Locomotives

WHEEL CENTERS OF THE THIN-WALL TYPE

In previous years your Committee has made report on the number of applications made on various Railroads, of wheel centers of thin wall section type. It was decided to discontinue listing all applications as they have become too numerous and therefore, this year we have shown only defects that have developed in the various types of wheel centers to date and feel report of this kind will give more information to members than the actual applications and will be of benefit to the manufacturers in discovering defects in design and making necessary correction for overcoming same.

[The report includes tabular details of each failed wheel center. A summary of the failures of wheel centers of this type is shown in the table.]

Summary of Failures of Thin-Wall Driving-Wheel Centers

Manufacturer	Total no. of wheels in service	Total defective	Percent defective
No. 1.....	861	35	4.0 Percent
No. 2.....	7437	30	.4 "
No. 5.....	502	1	.19 "
No. 3.....	239	10	4.1 "
No. 4.....	995	5	.5 "

DESIGN OF FRAME PEDESTAL TOES

Sub-Committee has been requested to prepare proposed designs to be added to the manual as recommended practice for pedestal toes. After sending out questionnaire and obtaining data on present designs of pedestal toes on later types of locomotives on large number of railroads Committee on Locomotive Construction recommends adoption of standards shown. The dimensions of toe are based on the width of the frame.

Two different styles are shown and it is the intention of the Committee to have both in the manual so that individual roads can select type desired. It is recommended that this be submitted to letter ballot.

[The width of the pedestal is shown as equal to the width of the frame and the length of the toe below the frame is not to exceed one-half the width of the frame. Taper is one in twelve. One style is tapered on both sides; the other is straight on one side. Fillets and corners are $\frac{3}{8}$ in. radius.]

[The chairman of the sub-committee reporting on design fundamentals is L. H. Kueck.]

Exhaust Steam Injectors

During 1938, a total of 58 applications of exhaust-steam injectors were made—19 by the locomotive builders and 39 by the railroads. At this date, the builders have orders for 8 locomotives to be equipped with exhaust-steam injectors.

In addition to those listed, there are on order at the Builders

two 4-10-2 locomotives which will carry 235 lb. boiler pressure that will be equipped with the turbo-injector.

[The chairman of the subcommittee is Henry Yoerg.]

Development and Use of Oil-Electric Locomotives

During the year 1938 110 Diesel locomotives were placed in service on 30 railroads or operating companies, making a total of 499 Diesel units in operation on 96 separate railroads or operating companies as of December 31, 1938, with no reported retirements, and as of April 1, 1939, there were 92 Diesel locomotives on order for 21 railroads or operating companies.

The diversified use of the Diesel locomotive is indicated in the horsepower of those units delivered as of December 31, 1938, as follows:

Horsepower	Delivered 1938	Delivered Prior to 1938	Increase during 1938 per cent
Less than 300	10	13	77.0
300 to 600	2	116	1.72
600 to 900	51	184	27.6
900	30	43	69.7
950 to 6,000	17	33	51.5

The 600- and 900-hp. Diesels still appear to be the most popular units, although their use is confined principally to switch and transfer service.

The maximum horsepower used in combination up to this time is 6,000. Three units of 6,000 horsepower were placed in service during 1938.

No additional units were assigned in freight service during the year 1938.

As of December 31, 1938, there is a total of 47 Diesel road passenger locomotives in service ranging in horsepower from 600 to 6,000 as compared with 27 units ranging from 600 to 5,400 hp. on December 31, 1937. As in previous years, no attempt has been made to include those Diesel locomotives operating in articulated trains.

At this time a questionnaire is before the membership for additional information, which was not available for inclusion in this report; however, all reports available to the committee have been carefully analyzed and, as approximately 44 per cent of the Diesel locomotives in service as of December 31, 1938, are in the 600 hp. group, some of them with at much as nine years' service life, and since fortunately replies to questionnaires indicated a greater volume of information covering the 600 hp. Diesels than for any other particular horsepower, this information was assembled and is included in the table showing as of

December 31, 1937, the service record of 600-hp. Diesel locomotives on selected railroads.

The committee has been unable satisfactorily to assemble information covering maintenance and operating costs of Diesel locomotives of heavier horsepower, operated in main-line passenger service, due to the fact that there is a variation in accounting practice on various railroads and available information cannot be assembled on a uniform basis. However, member roads are now making returns of information requested in the secretary's letter of December 12, 1938. It is hoped that this information will be sufficiently complete or that at least selected railroads can prepare this information on a uniform basis to permit of accurate comparison of such locomotives for a future report.

[The chairman of this sub-committee is H. P. Allstrand.]

Standardization of Valves for Locomotives

Your sub-committee reported in 1938 that work was progressing on designs for globe and angle valves suitable for 400 lb. pressure and 750 deg. F. temperature.

There is a very considerable difference of opinion among the various manufacturers as to the proper materials and the design to be used for valves of this character and up to the present time no standards have been developed. Recent investigations, however, have produced information which should be helpful and it is believed that during the coming year the committee will be prepared to make definite recommendations.

[The chairman of the sub-committee is J. B. Ennis.]

Roller Bearings Applied to Locomotives and Tenders

The answers to a questionnaire dealing with practices and performance were summarized in the report. Drawings and instructions of the manufacturers are generally followed for mounting and dismounting bearings. At class repair periods bearings are cleaned and inspected and, if in need of repairs they are returned to the manufacturers by many roads, or replacement parts are ordered and applied in the roads' own shops. Approximately half of the roads reporting have a central shop for this work.

When lubricant is renewed, the bearings are cleaned either by wiping or washing with kerosene, gasoline or light lubricating oil. When one or more axles are removed between shoppings for reconditioning without removing the bearings, the bearings are cleaned, examined and the original tolerances restored. When

Typical Service Records of 600-Hp. Diesel-Electric Locomotives operated by Selected Railroads to December 31, 1937

Railroad Index	No. of units	Years in service	Hours assigned	Hours operated	Percent assignment operated	Lubricating oil		Fuel oil		Repair cost			Percent repairs for Labor	Repair cost per hour	Hours operated per unit yr.	
						Gallons used	Gallons per hr.	Gallons used	Gallons per hr.	Labor	Material	Total				
1	2	3.0	6.0	46,450	37,392	80.50	5,099	1364	130,153	3.481		\$ 11,740		\$.3140		
	6	4.0	24.0	183,679	153,969	83.83	15,314	.0995	912,986	5.930		53,233		.3457		
	8	4.0	32.0	233,437	185,086	79.29	18,726	.1012	1,007,945	5.446		58,299		.3150	6,070	
2	6	7.95	47.70	421,560	286,350	67.93	*34,981	*.1701	2,150,349	7.510		212,946		.7437		
	7	2.5	17.5	175,008	129,079	73.76	12,046	.0933	877,179	6.796		59,998		.4648	6,370	
3	1	#9.0	9.0	78,888	44,373	56.25	10,692	.2410	350,498	7.899		69,222		1.5600		
	1	#9.0	9.0	78,888	46,498	58.94	9,537	.2051	370,725	7.973		59,480		1.2792	5,050	
4	1	3.5	3.5	26,923	26,923	100.00	2,239	.0832	170,669	6.339	\$ 7,988	\$ 2,679	10,667	74.89	.3962	
	1	3.5	3.5	23,210	23,210	100.00	3,167	.1364	184,865	7.965	10,071	2,129	12,200	82.55	.5256	
	1	2.58	2.58	18,795	18,795	100.00	1,542	.0820	118,598	6.310	5,362	1,320	6,682	80.25	.3555	
	1	2.16	2.16	16,239	16,239	100.00	1,251	.0770	104,196	6.416	5,343	803	6,146	86.93	.3785	7,255
5	1	5.25	5.25	46,462	34,744	74.78	4,114	.1184	276,924	7.970	15,905	12,634	28,539	55.73	.8214	6,620
6	1	7.33	7.33	56,666	48,483	85.56	6,300	.1299	406,067	8.375	13,761	14,277	28,038	49.08	.5783	6,615
7	1	2.83	2.83	21,481	19,560	91.06	1,311	.0670	123,930	6.336	7,833	2,254	10,087	77.65	.5157	
	1	3.25	3.25	26,333	25,107	95.34	2,266	.0903	150,566	5.997	7,627	3,174	10,801	70.61	.4302	
	1	1.33	1.33	10,860	10,139	93.36	1,173	.1137	44,784	4.417	2,664	1,434	4,098	65.00	.4042	
	1	1.33	1.33	10,853	9,701	89.39	1,117	.1151	43,657	4.500	2,802	1,556	4,358	64.30	.4492	
	1	1.33	1.33	10,535	9,390	89.13	1,266	.1348	40,896	4.355	2,818	1,169	3,987	70.68	.4246	7,340
8	1	1.46	1.46	10,880	10,425	95.82	743	.0713	62,574	6.002	2,281	714	2,995	76.16	.2873	
	1	1.33	1.33	11,014	10,451	94.89	921	.0882	69,040	6.606	2,292	806	3,098	73.98	.2964	
	1	1.46	1.46	10,909	10,440	95.70	673	.0645	64,827	6.209	2,110	583	2,693	78.35	.2580	7,370
9	1	1.33	1.33	11,105	8,599	77.43	1,534	.1784	39,927	4.643	4,045	911	4,956	81.62	.5763	
	1	1.16	1.16	10,096	7,685	76.12	1,259	.1638	36,076	4.694	3,410	453	3,863	88.27	.5027	
	1	1.17	1.17	9,928	8,428	84.89	1,256	.1490	37,649	4.467	2,735	389	3,124	87.55	.3707	
	1	1.16	1.16	9,749	6,750	69.28	1,623	.2404	35,287	5.228	2,945	567	3,512	83.86	.5203	
	1	1.0	1.0	8,194	4,115	50.22	1,157	.2812	25,738	6.255	2,207	448	2,655	83.13	.6452	
	1	6.0	6.0	50,284	35,957	71.51	11,429	.3179	257,431	7.159	13,418	12,237	25,655	52.30	.7135	6,050
Grand Total	51	195.66	1,618,426	1,227,888	75.87	152,736	.1244	8,093,536	6.591	\$117,617	\$60,537	\$703,072	66.02	.5726	6,275

*No lubrication records for 1929, 1930 and 1931.

#Units in service in 1927—no cost records prior to 1929.

machining wheels with the bearings mounted, the boxes are covered with burlap, canvas or sheet-metal guards. When equipment is stored, the boxes are oiled or greased and stored under cover. Engines in storage are moved periodically.

Roller-bearing failures result mainly from shelled races and rollers, broken races and rollers, and broken or worn cages. The causes are usually improper cleaning, lack of lubrication, or faulty material and construction.

Reports indicate an increase of 25 per cent to 43 per cent in availability of locomotives with roller bearings. Some roads report little or no difference in road delays due to hot boxes, while others claim a marked reduction. The majority of replies report no increase in mileage between shoppings, while others claim increases of 43 per cent to 100 per cent. Increased mileage between tire turnings run from 20 per cent to 50 per cent.

The reports indicate that the time between bearing renewals is lengthened with roller bearings and that there is a substantial reduction in maintenance—one road claims 50 per cent. Maintenance of driving boxes and hub liners has been materially reduced and reductions in rod-bearing maintenance from slight to 48 per cent for main- and 64 per cent for side-rod bearings are reported. No appreciable reduction in fuel consumption has been found by any of the roads reporting.

[The chairman of the sub-committee is H. Yoerg.]

Shelling of Trailer Wheel Tires

The committee appointed by the chairman of the sub-committee, to visit various shops regarding the machining and handling of trailer tires, developed nothing to account for the shelling. As a matter of fact, one road on which the handling of these tires is very good had more trouble than the others.

Some of the roads have recently adopted the use of heat-treated trailer tires, from which some relief from shelling has been experienced. However, the entire sub-committee feels that additional data should be collected for the next six month period, beginning April 1, 1939, in order to study further the performance of heat-treated tires.

The several roads having trouble due to shelling of trailer tires have been requested to furnish information regarding failures, mileage, and total number of heat-treated trailer tires in service, for a six month period starting April 1, 1939, and ending October 1, 1939.

[E. L. Bachman is chairman of this sub-committee.]

Construction of Locomotive Boiler by the Fusion Welded Process

At the Mechanical Division Convention held in June, 1937, the Committee on Locomotive Construction submitted a report on the above subject. This same subject was referred to briefly at a meeting of the General Committee held on June 29, 1938.

A locomotive boiler constructed by the fusion welded process was built and applied to Delaware & Hudson locomotive No. 1219 and after stationary tests to comply with Federal requirements were made, the boiler was released for freight service on September 24, 1937, for operation on the Pennsylvania Division of the Delaware & Hudson between Wilkes-Barre, Pennsylvania, and Oneonta, New York, a run of 130 miles. To further comply with Federal requirements, this locomotive was to be taken out of service every three months for the first year so that the boiler could be inspected.

[At the first three quarterly inspections the jacket and lagging were removed and the welding examined under 225 lb. boiler pressure. All seams were found in good condition. At the fourth inspection on September 20, 1938, which was also the annual test, the boiler was similarly examined under 340 lb. hydrostatic pressure. A similar test was made on April 3, 1939. In no case has there been any sign of a simmer or leak from any of the welded seams. At this time the locomotive had made about 105,000 miles.]

The committee will continue to follow this matter during the period of inspection required by the Federal Inspectors who specify that in the first year of service the lagging and jacket is to be removed and the joints examined each three months, in the second year each six months, and yearly thereafter for a period of five years. Each time the hydrostatic test is applied

it is to be not less than 50 per cent above the working pressure. [The chairman of the subcommittee is W. I. Cantley.]

Research Covering Axles, Crank Pins and Bearings

As reported to the General Committee on June 29, 1938, a questionnaire was submitted to the railroads asking for information concerning failures in service of axles and crank pins during the six-year period ending December 31, 1936. The information received from the railroads was tabulated and progress report prepared and mailed to the member roads.

Since that time an additional questionnaire has been submitted to the entire locomotive voting membership calling for extensive information on all crank-pin renewals from November 15, 1937, to February 15, 1938, and on failures only from February 15 to August 15, 1938. A number of replies have been received and as soon as all replies are in it is the purpose to prepare an additional report on this subject for the member roads. As soon as the report is completed it is the intention to send it to the General Committee for approval and upon receipt of this approval, send the report to all member roads. This will probably be ready for distribution early in the fall.

[K. Cartwright is chairman of the subcommittee.]

Obtaining Higher Train Speed Without Reduction in Trailing Load

This subject, as originally referred to the Committee in 1936, presented a problem of moving trains of 750 tons each, excluding weight of locomotive and tender, over level tangent track at speeds of one hundred miles per hour. Consideration was to be given to three forms of motive power, viz.: the reciprocating steam locomotive, the Diesel locomotive and the steam-turbo-electric locomotive. Later the requirements of the problem were changed to call for the movement of 1,000 tons of trailing load at one hundred miles per hour over level tangent track.

In 1937, a special committee was appointed to consider the future development of the reciprocating steam locomotive. The problem of handling 1,000-ton trains at speed of one hundred miles per hour with a reciprocating steam engine was turned over to this committee who are actively engaged with the problem.

The Committee on Locomotive Construction, through its sub-committee on oil-electric locomotives, is keeping in touch with developments in motive power of this type, but it has been only within the last year that there have been built any locomotives of this type sufficiently powerful even to approach the requirements of the problem. The construction and performance of these locomotives will be investigated and reported upon in due time.

The only development along the lines of a steam-turbo-electric locomotive, of sufficient power to meet the conditions of the problem, that has appeared to date consists of the double-unit locomotive recently built by the General Electric Company and delivered to the Union Pacific. Pursuant to a suggestion made by Mr. Burnett, of the Union Pacific, on presentation of the 1937 report of this committee, we requested the privilege of visiting the General Electric works where the locomotive was under construction, for the purpose of inspecting the locomotive and obtaining data regarding it for consideration and use in preparing a report. This privilege was not granted. However, we will continue our efforts to obtain data upon the construction and operation of this locomotive.

[W. I. Cantley is the chairman of the subcommittee.]

Other Items

The subcommittees on Locomotive Guiding and on Stresses in Rods and Motion Work reported progress.

The report as a whole was signed by H. H. Lanning (chairman), mechanical engineer, Atchison, Topeka & Santa Fe; H. P. Allstrand (vice-chairman), principal assistant superintendent motive power and machinery, Chicago & North Western; E. L. Bachman, general superintendent motive power, Pennsylvania; G. McCormick, general superintendent motive power, Southern Pacific Company; W. F. Connal, mechanical engineer, Canadian National; J. E. Ennis, engineering assistant, New York Central; J. B. Blackburn, mechanical engineer, Chesapeake & Ohio; L.

H. Kueck, chief mechanical engineer, Missouri Pacific; Henry Yoerg, general superintendent motive power, Great Northern, and K. Cartwright, mechanical engineer, New York, New Haven & Hartford.

(The report was accepted and recommendations submitted to letter ballot.)

Utilization of Locomotives and Conservation of Fuel

The committee reported that no field surveys were made during 1937 and 1938. Its report this year is devoted to the presentation of statistical data pertaining to traffic volume and locomotive performance during 1937 and 1938, compared with selected preceding years. Some of these comparisons for freight and passenger service are briefly summarized here.

An average freight-train speed of 16.6 m.p.h. and a trainload of 1,895 tons in 1938 compare with 16.1 m.p.h. and 1,902 tons in 1937; 10.3 m.p.h. and 1,443 tons in 1920. The gross ton-miles per train hour in 1938 were 31,138; 30,349 in 1937; and 14,877 in 1920. In 1938 miles per active locomotive-day in freight service averaged 99 and the hours in service per day 4.93. In 1937 active freight locomotives averaged 104.5 miles per day in 5.32 hours. In 1920 miles per day were 91.1 and service hours 7.28. In 1938 fuel performance was 132 lb. per thousand gross ton-miles, excluding the locomotive, and 4,096 lb. were consumed per train-hour. This compares with 134 lb. per thousand gross ton-miles and 4,061 lb. per train-hour in 1937. In 1920 fuel consumption was 197 lb. per thousand gross ton-miles and 2,927 lb. per train-hour.

In passenger service the total locomotive-miles per active locomotive-day averaged 177.5 in 1938. There were an average of 7.91 cars per train and 15.8 lb. of fuel consumed per car mile. In 1937 active passenger locomotives averaged 176.4 miles per day, handled 7.87 cars per train, and burned 15.9 lb. of fuel per car-mile. Comparing with 1920, active locomotives averaged 150.1 miles per day during that year with an average train of 6.44 cars. Fuel consumption was 18.8 lb. per car-mile.

In 1938 fuel for yard and train locomotives charged to operating expense accounted for 8.2 per cent of operating expenses and 6.3 per cent of operating revenues. In 1937 fuel represented 8.3 per cent of operating expenses and 6.2 per cent of operating revenues. The comparable figures for 1920 are 11.6 and 10.9, respectively.

The report was signed by J. T. Gillick (chairman), vice-president, Chicago, Milwaukee, St. Paul & Pacific; H. E. Newcomet, vice-president, Pennsylvania, and R. E. Woodruff, vice-president, Erie, for the Operating Division, and by W. H. Flynn, general superintendent motive power and rolling stock, New York Central System; J. W. Burnett, general superintendent motive power and machinery, Union Pacific, and O. A. Garber, chief mechanical officer, Missouri Pacific Lines, for the Mechanical Division.

(The report was accepted.)

Report on Further Development of Reciprocating Steam Locomotive

As the result of failure to obtain unanimous approval of the theoretical power requirements and the number of locomotive driving wheels and cylinders required to haul a train of 1,000 trailing tons at a sustained speed of 100 m.p.h., as covered by specifications in our first progress report, following discussion by the General Committee at the meeting June 29, 1938, it was decided that the Committee on Further Development of Reciprocating Steam Locomotive should be continued and it was instructed by the General Committee to work up plans for testing the latest types of steam locomotives, using a dynamometer car where necessary, and to submit recommendations to the General Committee.

Consequently, your committee worked up plans to conduct tests on the Pennsylvania, Chicago & North Western and Union Pacific on level tangent track at speeds of 100 m.p.h., using a trailing load of 1,000 tons. These test runs were made in October, 1938,

and the data collected were assembled in report form. This report and the recommendations of your committee contained therein were approved by the General Committee at its meeting March 24, 1939, and, because of its importance to member lines who might be considering the acquisition of new locomotives, it was decided to distribute the report in advance of the regular annual meeting. This has been done and the report is now in the hands of all member roads.

The committee recommends that the above mentioned A. A. R. Passenger Locomotive Test Report be printed in the 1939 proceedings as a permanent record.

With further respect to this report, the committee respectfully calls particular attention to recommendations resulting from these tests contained in report of Subcommittee No. 2 which becomes a part of this report.

The following divisions of the committee, namely: Subcommittee No. 1—technical, subcommittee No. 2—cylinders and valves, subcommittee No. 3—boiler, subcommittee No. 4—design, are now engaged in formulating recommendations for a general design of proposed locomotive capable of meeting the demands indicated as necessary by the road tests which, incidentally, closely approximate the estimated requirements incorporated in Progress Report No. 1, viz.,

- 1—4,000 drawbar horsepower as required for a 1,000 ton trailing load at 100 m.p.h. sustained speed.
- 2—Cylinder h.p.—6,400.
- 3—Four-cylinder engine.
- 4—Approximately 300 lb. boiler pressure and 750 deg. F. steam temperature at the boiler.
- 5—Conventional radial-stayed type boiler.
- 6—Factor of adhesion, 4.5 if possible.
- 7—Boiler to be able to supply 100 per cent cylinder demand plus steam demand for auxiliaries.
- 8—Calculations to be based on bituminous coal having 12,000 B.t.u.
- 9—Design of locomotive to be of conventional type, with provisions for streamlining.
- 10—Driving-wheel arrangement to be 4-4 coupled.
- 11—Engine designed for maximum curvature of 18 deg.
- 12—Driving-wheel diameter of 84 in. preferred.
- 13—Anti-friction journal bearings throughout.

The committee now has under consideration a project anticipating the use of a locomotive for experimental purposes in connection with proving or disproving various recommendations for the improvement of existing locomotives and incorporating in the design of new steam locomotives. Further information regarding this will be forthcoming at a later date, probably some months hence.

Particular reference is called to report of Subcommittee No. 1 with respect to recommendations concerning the question of counter-balancing of locomotives. In order to give this important subject the necessary attention the committee has appointed a special subcommittee composed of the following: W. I. Cantley (chairman), mechanical engineer, Mechanical Division, A. A. R.; E. G. Young, professor, University of Illinois, Urbana, Ill.; Lawford H. Fry, railway engineer, Edgewater Steel Company, Pittsburgh, Pa.; A. J. Townsend, Lima Locomotive Works, Inc., Lima, O.; H. Glaenger, vice-president, Baldwin Locomotive Works, Philadelphia, Pa.; J. G. Blunt, mechanical engineer, American Locomotive Company, Schenectady, N. Y.; W. R. Elsey, mechanical engineer, Pennsylvania, Philadelphia, Pa.; K. Cartwright, mechanical engineer, New York, New Haven & Hartford, New Haven, Conn.; H. H. Lanning, mechanical engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.

This subcommittee has already started to function and it is hoped will be in position to make recommendations within a few months.

Subcommittee No. 4—Design, will be in position to make available a general drawing covering a tentative design of proposed locomotive capable of hauling a 1,000-ton train at a 100 m.p.h. sustained speed on tangent level track. This design will be forthcoming in the near future, at which time it will be made available to the full membership of the association.

The committee gratefully acknowledges the invaluable assistance and the cooperation extended by those who have par-

ticipated in its work, particularly the Pennsylvania, Chicago & North Western and Union Pacific, which furnished the equipment for the test runs and over which lines the tests were made.

Report of Subcommittee No. 1—Technical

The entire question of counterbalance is in a chaotic condition. Quoting from a letter written by Mr. Cantley to Mr. Ellis on April 26, 1939: "As you will recall, there was a recommended practice of counterbalancing locomotives adopted in 1931*, but in 1934 the Committee on Locomotive Construction reviewed this matter, and included in their revision the cross-balancing of the intermediate drivers.** Since 1934, operating conditions of steam locomotives require schedules for considerably higher speeds than were required prior to 1934, and operating at these higher speeds of necessity requires more refinement in counterbalancing. . . . This has been demonstrated over the past year or more through some tests made by several roads at very high speeds." In view of these conditions and our own study of the conflicting processes now used in balancing, this subcommittee proposes to prepare a "primer" or "textbook" on counterbalance, in which there shall be set forth, with fully calculated examples, a full theoretical treatment of the dynamic counterbalance procedure, which after approval by the main committee will be used in analyzing the balance conditions of several existing engines, and which may be of assistance to the new counterbalance committee elsewhere referred to.

Further, in view of these conditions, this subcommittee placed before the main committee the recommendation that it recommend to the General Committee of the division a series of tests under service conditions designed (a) to determine the portion of the reciprocating weight, in terms of the weight and length of the locomotive, which may remain unbalanced, and (b) to determine the absolute merit, in terms of locomotive riding and rail effect, of various methods of balancing.

"In cases where there are two main wheels such as the locomotives whose main rods are coupled to the main side rods, the second pair of main drivers should be cross-counterbalanced as well as given its portion of reciprocating balance as is done with the conventional type of coupling."

[The chairman of this subcommittee is E. C. Schmidt.]

Subcommittee No. 2—Cylinders and Valves

On May 1, 1939, at Pittsburgh, Pa., Subcommittee No. 2, with full membership attendance, held a joint meeting with Subcommittee No. 1.

The purpose of the meeting was to report on a proposed new valve gear and poppet valve design. The committee had before it a statement giving full information in connection with this proposed valve gear and poppet valve design based on cylinders 21¼ in. by 26 in. Similar information was also shown for a 12-in. piston valve operated by a Walschaert valve gear.

The joint committee discussed this information with relation to the problem of obtaining more efficient cylinder performance, particularly at high speeds. The conclusions reached are given below.

RATIO OF EXPANSION

High cylinder efficiency requires a high ratio of expansion, which means a short cut-off. With conventional valves and valve gears the limit of satisfactory operation is reached when the cut-off is shortened to about 25 per cent. If shorter cut-offs are tried the early release operates against full expansion and the early compression leads to excessive compression pressures.

The information available regarding the new type valve gear and valve design indicates that with a cut-off of 15 per cent, or perhaps even less, a satisfactory sequence of valve events can be obtained. The resultant high ratio of expansion should give a correspondingly high degree of cylinder efficiency. The me-

chanical problems involved in operating with short cut-offs were discussed. It was concluded that there does not seem to be any practical or theoretical objections to the use of a 15 per cent cut-off on a locomotive. This view is supported by stationary and marine engine practice.

WATER RATE

The high ratios of expansion obtainable with poppet valves and special valve motion will produce high cylinder efficiency. It is believed that it should be possible to design cylinders to operate at 400 r.p.m. (100 m.p.h. with 84-in. drivers) with a water rate of 14 lb. of steam per h.p.hr. With conventional cylinders, valves, and valve motion a water rate of 15 lb. per indicated horsepower per hour is considered to be good practice.

CYLINDER DESIGN

To obtain full benefit from improved valves and gears, all steam passages must be carefully designed. Ample cross-sectional area must be provided for the free flow of the steam from the boiler through the superheater and steam pipes to the steam chests. The steam-chest volume must be large and the cylinder passages smooth and of large area so that the quantity of steam required for maximum cylinder demand can be delivered without undue loss of pressure. The exhaust passages must also be of ample cross-section so that the steam may be evacuated without building up unnecessary back pressure.

LIMITATIONS ON CYLINDER HORSEPOWER

Analysis of the performance of the locomotives used in the A. A. R. passenger locomotive tests of October, 1938, shows that the maximum cylinder horsepower was reached at speeds of 370 to 390 r.p.m., 70 to 80 miles an hour. At higher speeds the cylinder horsepower dropped off. The peak horsepower corresponds to a definite rate of steam flow through the steam passages. The speed could be increased by increasing the rate of steam flow, but this entails greater frictional losses. These losses cut down the initial pressure and increase the back pressure so that the mean effective pressure is reduced. To maintain these higher speeds the load must be reduced so that the locomotive operates at a lower cylinder horsepower rate.

The joint committee points out that over-all locomotive efficiency can be improved and the speed at maximum horsepower can be raised if ample valve openings are obtained and if all cylinder passages are designed for a free flow of steam.

RECOMMENDATION

In presenting this report the joint subcommittees express the opinion that they have carried their study of the subject as far as they can go by theory alone. It has been shown that it should be possible to make considerable improvement over the efficiency obtainable with conventional cylinders and valves. The next step is to demonstrate this improvement in practice.

The joint subcommittee recommends strongly that the A. A. R. Mechanical Division be asked to carry out tests of a locomotive fitted with improved cylinders, valve gear and poppet valves. Such tests would show the advantages to be obtained from high ratios of expansion and unrestricted steam flow.

[The chairman of subcommittee No. 2 is Lawford H. Fry.]

Report of Subcommittee No. 3—Boilers

The subcommittee made a study of the comparative advantages of Belpaire vs. radial-stay type back-end construction. It also considered the barrel-type combustion chamber with moderate depth of throat sheet vs. shallow throat sheet with a long fire-box equipped with a Gaines arch.

In studying the steam rating for the boiler, we considered available data from Pennsylvania tests, from the C. & O. and from the New York Central Gardenville test, and designed a boiler for 105,000 lb. of steam per hour on the basis of no allowance for the feedwater heater, for coal with 12,000 B.t.u.

* Based on Mr. Riegel's Subcommittee report in the 1930 Proceedings, which dealt with the main driving wheels only.

** This is further explained in the last paragraph on page F-140A-1935 of the Mechanical Division Manual which reads:

and for a reasonable rate of combustion with a horizontal mud ring to obtain a level grate.

The subcommittee accordingly prepared a preliminary boiler design which has been sent to the chairman, Subcommittee No. 4. This design is based on an assumed evaporation of 5.4 lb. of water per lb. of coal and an evaporation of 20.6 lb. of water per sq. ft. of heating surface, which will mean a coal consumption of 19,500 lb. per hour and 152 lb. per sq. ft. of grate per hr.

Our committee has discussed possible improvements in boiler performance of existing locomotives rather informally and offers the following comments:

1—The addition of brick arches and superheaters to existing locomotives which were not so equipped has been done to a very general extent and there are probably few existing locomotives now without these accessories to which their application would be justified. We have considered various forms of circulating devices in fireboxes and believe that further experience in actual service may warrant some definite recommendations later on.

2—We have had some discussion on suggested basic modifications in the design of brick arches and superheaters, but do not feel that the time is ripe for definite recommendations.

3—Possible changes in connection with improvement in the cross-sectional area of dry pipe, throttle pipe and steam passages would, no doubt, in many cases reduce the drop in steam pressure at the cylinders and the committee feels that studies of this character would in specific cases be worth while, but as yet, no definite recommendations are made.

4—We are informed that an experimental application of an automatic stoker discharging fuel into the firebox from the front end instead of the rear is showing good results and reducing cinder cutting very materially. This application, however, is still in a preliminary stage and no definite report can be offered at this time.

5—In connection with the use of automatic stokers a definite check-up on the type of grate bars may result in fuel saving and better combustion.

A comprehensive study of drafting arrangements in the smokebox might also result in suggested changes that would improve combustion and improve the steaming qualities of existing boilers.

[The chairman of this subcommittee is J. B. Ennis.]

The report was signed by D. S. Ellis (chairman), chief mechanical officer, Chesapeake & Ohio; W. I. Cantley (vice-chairman), mechanical engineer, mechanical division, Association of American Railroads; W. R. Hedeman, engineer tests, Baltimore & Ohio; J. E. Ennis, engineering assistant, New York Central; W. R. Elsey, mechanical engineer, Pennsylvania; J. M. Nicholson, mechanical superintendent, Atchison, Topeka & Santa Fe; Lawford H. Fry, railway engineer, Edgewater Steel Company; W. E. Woodard, vice-president, Lima Locomotive Works, Inc.; H. Glaenger, vice-president, Baldwin Locomotive Works; J. B. Ennis, vice-president, American Locomotive Company; E. G. Bailey, vice-president, Babcock & Wilcox Company; and Edward C. Schmidt, professor of railway engineering, University of Illinois.

Discussion

Representatives of the three steam locomotive builders who were invited to discuss this report united in emphasizing the importance of the proposed road tests which will serve as a definite basis for recommendations regarding such important locomotive details as counterbalancing, new types of valve gear, valves, etc. W. H. Winterrowd, vice-president, Baldwin Locomotive Works, said that the report is a valuable contribution to progress in locomotive design and suggested that arrangements be made to keep the proposed textbook on counterbalancing up to date so that it will be of maximum value for reference purposes. He requested that the committee clarify its meaning whenever reference is made to the length and weight of a locomotive to indicate whether the tender is included, as tender weight may be given consideration under certain conditions in deciding what proportion of the reciprocating weights must be balanced.

Mr. Winterrowd said that the poppet-type valve as now developed looks promising, especially when combined with suitable design for a minimum pressure drop in the steam pipes and minimum back pressure. He also referred to the desirability of having locomotives designed for a large cruising radius and maximum availability. He said that further substantial improve-

ments in steam locomotives are now under way and that, for best results, high capacity and reliability of performance must be combined with relatively low first cost and maintenance expense.

J. B. Ennis, vice-president, American Locomotive Company, said that reciprocating steam locomotive design has made important advances in recent years and that still further improvements can be made. He stressed the importance of laboratory research, supplemented by road tests of various important parts of steam locomotives, particularly in view of the lack of complete performance data covering these various details at speeds of 80 to 100 m.p.h.

Mr. Ennis called attention to the fact that formulae used in calculating locomotive horsepower indicate what would be expected from a locomotive 15 or 20 years old and give results very much on the conservative side. He said that a study should be made of important locomotive details which give promise of improvement and suggested tests to determine actual net results, bearing in mind that desirable reductions in steam and fuel consumption should be secured but not at the sacrifice of availability or low maintenance cost.

W. E. Woodard, vice-president, Lima Locomotive Works, Inc., complimented the committee on its constructive work which he said will have a decided influence upon future improvements in steam motive power. He indicated that several potentially important developments in locomotive design are either ready for the testing stage, or nearing that point. Laboratory tests, conducted under proper conditions, may supply information which will save a large amount of time and expense when the test application stage is reached.

Mr. Woodard referred to the importance of producing various parts of locomotive valve motion by precision methods and of using anti-friction bearings throughout in order to avoid deflection and distortion of valve events at high speeds. In closing his remarks, he referred to the subject of locomotive back pressure as influenced by exhaust-passage design and said that tests, carried out by releasing definite volumes of air at varying pressures through different forms of exhaust passages cast from plastic wood, have provided useful and interesting information. Also, that the results are being incorporated in a set of cylinders now under construction. Mr. Woodard referred to these subjects only as examples of improvements which may well be tested in the experimental locomotive referred to in the committee's report.

(The report was accepted and ordered printed in the proceedings.)

* * *

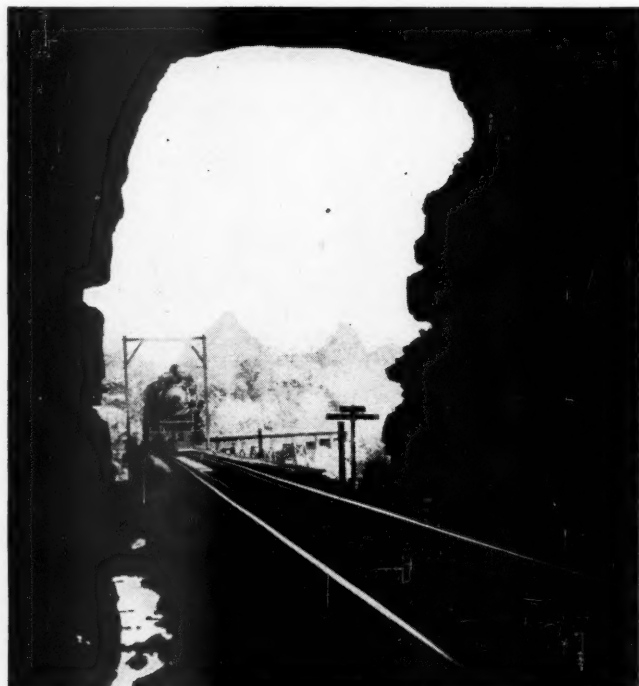


Photo by T. O. Acree

Train No. 16, Southern, Entering Cumberland River Tunnel at Burnside, Ky.

More About Rail Joints*

Another year of laboratory and service tests conducted by the A. R. E. A. and collaborators discloses further fundamental information

By Dr. A. N. Talbot

Professor Emeritus, University of Illinois

In the accompanying comments Dr. Talbot, chairman of the Special Committee on Stresses in Railroad Track, discusses the extensive field and laboratory tests which were carried out by the committee during 1938 to determine the service to which rails and rail joints are subjected. His comments deal with the measurement of rail stresses, bolt tension and rail movement in joints; observations on welded track installations; rolling-load tests on various types of joint bars and observations of the failures which occurred.

THE Stresses in Track investigation being conducted by the Special Committee on Stresses in Railroad Track has continued its co-operation with the Committee on Rail in making observational tests on the rail joints in the 12 half-mile stretches of track on the Pennsylvania and the 9 one-mile stretches of track on the Atchison, Topeka & Santa Fe, and, as a result, has made substantial progress. The observational tests carried on during the last year included rail surface middle ordinates in $3\frac{1}{2}$ in.; vertical mid-ordinate and lateral mid-ordinates of joint bars; profile of the rail at the joint; profile of the fishing surface of the bar; rail batter; fit of bar; bolt tension; out-to-out distance of bars at three points in their lengths; and joint gap openings; besides the appearance of wear and variations in fishing heights. The report of the Sub-committee on Service Tests of Various Types of Joint Bars, of the Committee on Rail, included in Bulletin 409, gives the latest information on the progress of these tests. It is expected that these various tests and measurements will give pertinent information in regard to wear and its sources, the changes that occur in the parts of the joints, the characteristics of deterioration and the requirements of joint maintenance for all of the various types of joint bars under observation. Supplementing the data given in the report, comments are made here on a few matters of current interest.

Periodic Measurements of Bolt Tension

It is thought that information on the magnitude of the bolt tension put into the joints and its decreases under time and traffic, its action on retightening, and the general effects of low, moderate, and high tension in the

* An abstract of remarks made by Dr. Talbot in presenting the report of the Special Committee on Stresses in Railroad Track (of which committee he is chairman), to the convention of the American Railway Engineering Association.

bolts is greatly needed as bearing on the life and the maintenance of joints; and attention is being given by measuring the bolt tension on a limited number of joints at different times, especially just before retightening and afterward, and again still later.

In Fig. 1 are plotted the average observed values of the bolt tension on each of the nine test sections on the Santa Fe. The bolt tension first measured in November, 1937, three or four months after the final surfacing and retightening of the bolts, is represented by the rectangles having diagonal hatching. These early averages of bolt tension ranged from 5,000 to 15,000 lb. The solid, black rectangles represent the tension measured in February, 1938, and in general, show a slight dropping off in the tension. Immediately after these readings were taken, the bolts were retightened, the tension being increased materially, as shown by the open rectangles. The existing tension was again measured in July, 1938, shown by the lined rectangles. It will be seen that during this five-month period the drop in tension ranged from 5,000 to 8,000 lb.—an average loss of 37 per cent. In October, 1938, the tension was again measured on three sections, represented by the rectangles with cross lines, and the loss in tension averaged about 36 per cent.

It is apparent that the first measured tension (that measured three or four months after the final retightening after track laying) was fairly permanent, with little loss through wear of bars and adjustment into place. In the February tightening the intent was evidently to increase the tension considerably, but the higher tension did not hold well, and it continued to decrease, as shown

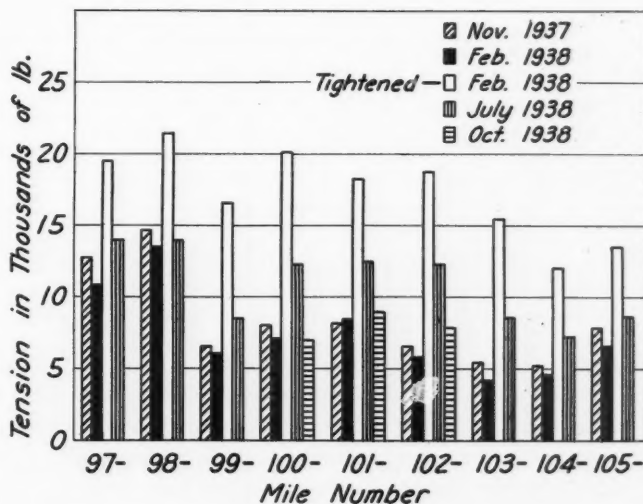


Fig. 1. Average Bolt Tension on Each of the Nine Test Sections on the A. T. & S. F.

by the October observations on the three sections measured. It may be well to add that the washers used in these joints give little travel for bolt tensions beyond a few thousand pounds.

In the joints on the Pennsylvania, the measurement of tension showed that the bolts averaged about one-third less tension in October, 1938, than in November, 1937, with no tightening of the bolts in the interval between these measurements. A loss of this kind is to be expected because of some wear of the bar and rail and because the bar and rail have been pulled closer together through the action of traffic. The average tension per

lying near the average. The average change per joint for the upper diagram is 0.16 in. and for the lower 0.19 in. These average changes in gap correspond to 0.68 and 0.82 of the calculated unrestricted temperature expansion of rail steel over the temperature change for the two sections, respectively. It may be noted that the average bolt tension for the joints measured in the upper diagram was 19,000 lb. at the winter gap readings and 12,000 lb. at the summer gap readings, and the corresponding average bolt tensions in the lower diagram were 15,000 and 8,000 lb. The higher ratio of movement to calculated expansion in the latter section could be due partly to the lower bolt tension and partly to the presence of four bolts instead of six.

In Fig. 3 are shown similar percentages for two half-mile sections on the Pennsylvania. In the upper diagram the distribution of gap for the 24-in. A. R. E. A. joint bar is quite similar to that found in Fig. 2. The average change in gap is 0.18 in., which for a 75-deg. change in temperature corresponds to 0.80 of the full contraction of rail. The bolt tension averaged 11,000 lb. one month after the summer gap readings were taken and three months before the winter gap readings. The joints of the lower diagram have 36-in. head-free bars. The values indicate a greater restraint and a larger proportion of joints with no or relatively little gap change than are shown in the upper diagram. The average change in gap of 0.11 in. represents 0.44 of the calculated unrestricted contraction for the 83-deg. change in temperature. Doubtless the higher restraint is largely due to the high bolt tension which, for the joints measured one month after the summer gap measurements, averaged 27,000 lb., while the tension measured for joints in the upper diagram averaged 11,000 lb.

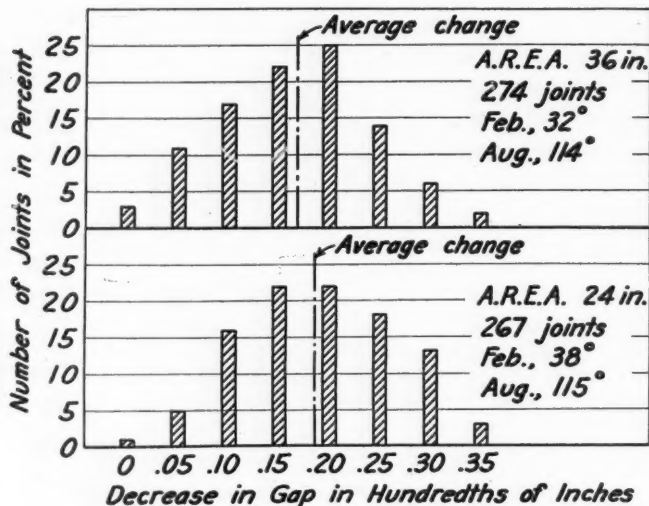


Fig. 2. Changes in Rail Gap on Two Test Sections on the A. T. & S. F.

bolt in the several sections in October, 1938, ranged from 7,000 to 12,000 lb. (with 27,000 lb. on one type of bar). Later measurements showed that some joints had less than 5,000 lb. in one or more bolts. A few joints showed even lower tension. Notwithstanding that tension in the bolts of many of the joints may be called moderate or even low, the condition of these joints remains satisfactory.

Joint Gap Measurements

The measurements being made of changes in the length of rail gap due to changes in temperature between summer and winter will be useful in learning the variations in movements of rail ends at the joints and in holding or "freezing" for the different types of joint bars and different bolt conditions, as bearing on variations in the wear and life of the joints. In Fig. 2, there are shown the number of joints developing decreases in gap from 0 to 0.35 in. between a rail temperature of about 35 deg. F. in February, 1938, and about 115 deg. F. in August, 1938, for two sections on the Santa Fe—the number of joints with a given gap being stated in percentages of the whole number in the mile, and the changes in gap being grouped to the nearest 0.05 in. The mile shown in the upper diagram has 36-in. bars and that in the lower diagram 24-in. bars. It will be seen that on both sections the groupings range from a small per cent with no movement upward to 22 or 25 per cent with changes near the average, and then drop sharply downward to a small per cent with a change of gap of 0.35 in. The distribution of the changes in gap in these sections may be said to approach the ideal practicable—few frozen joints and few of large gap, with most of the movements

Observations on Welded Track

The observations on the several stretches of continuously welded rail have now extended over a period of three years on the Delaware & Hudson and two years on the Bessemer & Lake Erie. The measurements have

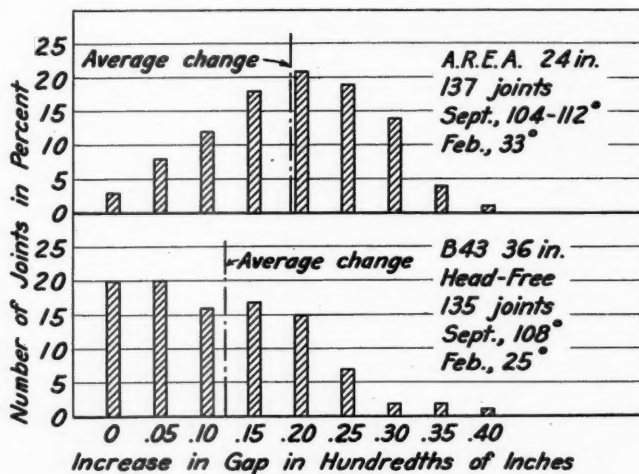


Fig. 3. Changes in Rail Gap on Two Test Sections on the Pennsylvania

consisted mostly of strains in the rail and the corresponding temperature of the rail for the ranges of temperatures found in the winter and summer seasons.

As the service on part of the D. & H. test track has now covered a period of three years, it will be well to compare some of the results for the whole period to

find how stable and consistent the action of the track has been. Figure 4 represents the temperature stresses in the two rails, measured over the three-year period at five points near the south end of a test stretch on the D. & H. The points are situated from 10 ft. from the end back to 370 ft. from the end. The readings are the results of the summer and winter tests of 1936, 1937 and 1938. In many cases all the points could not be plotted to the scale of this diagram because of the close similarity of the results. The reference temperature for the stresses is 73 deg. F. and is based on a set of readings taken in the summer of 1936. The first set of readings taken in the summer of 1935 is omitted because of the large adjustment in rail length that occurred in cold weather when the south end of the track pulled out.

It will be noted that at all five locations on both rails there is a straight-line relation between rail tem-

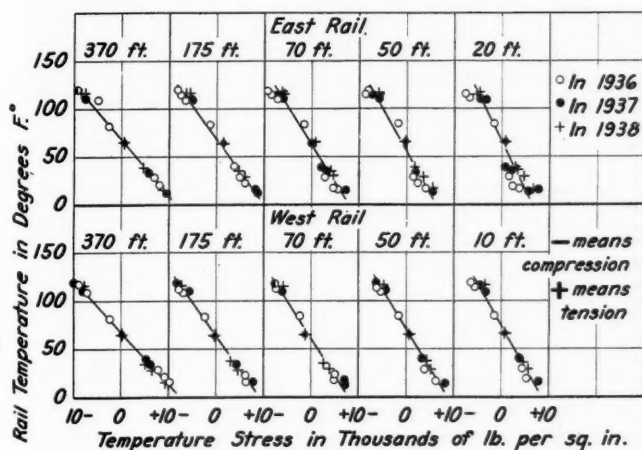


Fig. 4. Temperature Stresses in Rail Near One End of a Welded Stretch on the Delaware & Hudson

peratures and temperature stress. This indicates that along the anchored portion of the test stretch the temperature stress in the rail at any place is always closely proportional to the change in temperature. Thus the length of track given anchorage remains the same throughout the range of temperature under both tensile and compressive forces, and the anchorage force given by a tie is proportional to the temperature and does not have a constant value as has been assumed in some analyses.

The magnitude of the temperature stresses increases gradually from the end of the stretch to the fixed portion. The stresses amount to about 6,000 lb. per sq. in. at the end of the stretch and increase to about 10,000 lb. per sq. in. at 370 ft. from the end. The development of the stress of 6,000 lb. per sq. in., shown at 10 ft. and 20 ft. from the end, requires a pull or push through the joint from the adjoining stretch of about 75,000 lb. for each rail for a 50-deg. F. increase or decrease from the base temperature. The uniform relation between temperature and stress in the rail at all these places for the six sets of observations and the condition of the track at higher and lower temperatures show that the same relations of stress and position of track have been sustained even for extremes of temperatures beyond the plotted range covered by the observations. The close grouping of the points show that this track (which is considered representative) has been stable and consistent in its behavior during the three-year period.

Some portions of the test stretches have been subject to local variations, the effect of which was apparent in the observations. Replacement of a couple of welds al-

lowed the track to readjust itself, as was also the case when some of the track was given a lift and surfacing. One stretch laid at a high rail temperature pulled out at one end during cold weather and was loosened for adjustment at the other. These local variations sometimes obscured the action of the track for temperature changes. It is judged important to lay the track at a median or moderate rail temperature to equalize the tensile and compressive forces.

Moments in Rail in Pennsylvania Tests

The tests made of rail joints and track on the Pennsylvania, the equipment used and the readings taken were described in considerable detail before the convention last year.*

The study of the effect of speed and other conditions on stresses in rail and in joint bars was rendered difficult by variations in the action of the locomotive, especially at the higher speeds. This was the case even though the locomotive used for loading the joints was an electric locomotive, with no unbalanced rotating or reciprocating forces. Something of the variation found with the locomotive is shown in Fig. 5. This figure gives the moments obtained from the measured stresses in the base of the rail by four of the six strain gages used and for the three driving wheels of the locomotive. The values plotted for each location are from a pair of strain gages directly opposite each other on the two rails. It should be noted that zero axes are not shown on the diagram. Most of the plotted points are the average of several runs at the given speed.

A principal matter of interest in this diagram is the

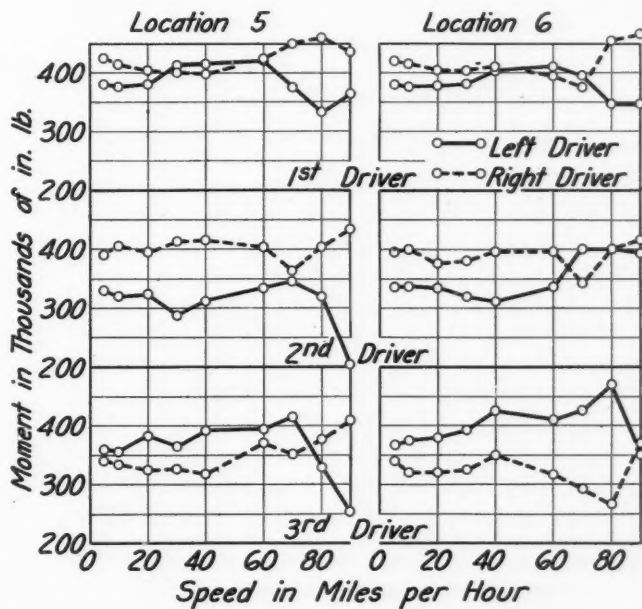


Fig. 5. Moments in Each Rail Under the Drivers of Pennsylvania Electric Locomotive 4779

relation of the bending moments in the right and left rails for driving wheels on the same axle. It is seen in practically all cases that at a given speed a variation of bending moment in one direction on one rail is matched by an approximately equal and opposite change in magnitude in the other rail. The summation or average of the two rails for the first, second or third driver would give an almost exactly horizontal line, indicating a net speed

* Described in the *Railway Age* of June 25, 1938, page 1042.

effect for the two sides of negligible amount. The locomotive would appear to have been rocking from side to side or perhaps oscillating longitudinally about a vertical axis, with lateral pressures against the rails, and that its rocking or oscillation was at different phases on passing an instrument at the various speeds. The data illustrate some of the variations in the action of a locomotive found in field tests even under optimum conditions.

Stresses in Joint Bars

Stresses and relative movements were measured in various types and sections of joint bars under various conditions, for speeds up to 90 m. p. h. Joints were tested with the joint bars used as found, with bars ground to straight true surfaces ("machine fit"), ground to simulate a worn condition, and as found after considerable service in track. Some joints were tested to compare bars with controlled bearing and full bearing. Long bars and short bars were also tested under conditions otherwise comparable. It was found in these tests that the variables present in the track and the locomotive to some extent obscured or counteracted the effect of the variations in the type of bar or its conditions. Certain variable factors in the bars themselves, unrelated to the subject of the test, caused variations of sufficient magnitude to be of primary importance. One of these factors was camber of the rail joint, which has been found to be determined by the camber or condition of the bars.

Bending moments found from the measured stresses in a representative group of the rail joint tests are given in Fig. 6. The joint bars in all cases are a moderate-weight symmetrical section for 131-lb. rail, and three joints were tested at three locations for each test condition. Two test joints in Location 1 and Location 3

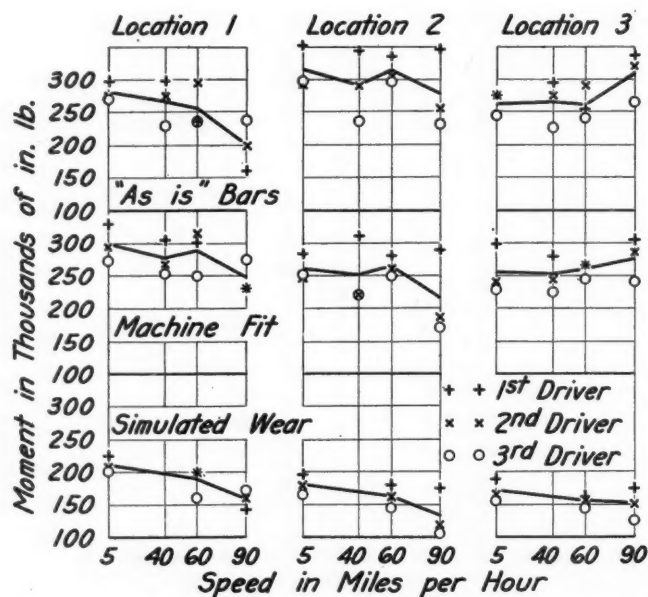


Fig. 6. Moments in Rail Joints With Three Conditions of Bars—Pennsylvania Tests

were on the right rail and were consecutive; that on Location 2 was on the left rail midway between the other two.

Inspection of this figure shows a wide spread of values for the several driving wheels at the higher speeds in somewhat the same manner as illustrated in the tests of rails shown in Fig. 5. The grouping of the points at five

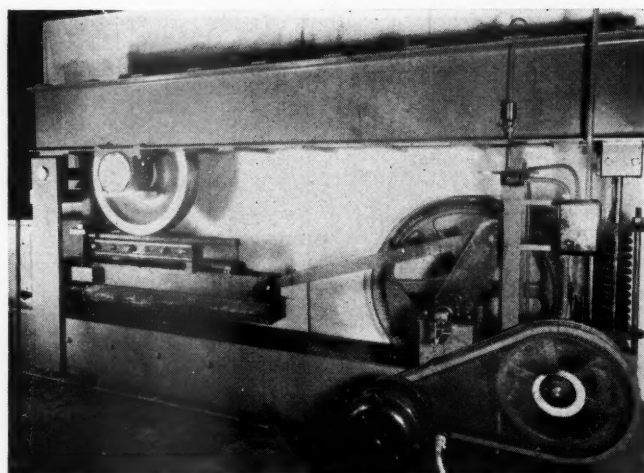


Fig. 7. View of the 33-In. Stroke Rolling-Load Testing Machine

miles per hour is generally much closer than at the higher speeds, and the relative position of the points is often reversed at the higher speeds from that at five miles per hour. It may be stated that the weighed loads for the driving wheels on the right side of the locomotive were appreciably greater than on the left side.

It may be expected that the driving wheels of this locomotive will develop a bending moment in the rail of 350,000 to 400,000 in.-lb. The effectiveness of a rail joint may be said to depend upon the closeness to which the moment developed approaches that of a full rail, though it is not to be expected that the values for the joint will reach those of the full rail. An ineffective joint will develop a smaller bending moment than that given by a rail; in other words, a joint that develops materially smaller bending moment (and has a smaller stiffness) is not doing its work properly. In the figure, the values for the bending moments (recalling that the weights applied on the two rails may not be the same at the high speeds) are fairly high for the "as is" joint bars and for the "machine fit" bars, while those for the "simulated wear" condition are materially lower, being in some cases as low as 150,000 in.-lb.

The trend of the moment values as the speed increases is seen to be variable and in some cases even downward, indicating smaller stresses. This trend is felt to be primarily a result of oscillation or rocking of the locomotive or lateral pressures applied by the wheels in a particular manner at a certain location rather than an actual improvement of the stress values for higher speeds.

The Rolling-Load Testing Machine

Figure 7 is a view of the new rolling-load rail-joint testing machine which was put into continuous operation in October, 1938. The purpose of this machine is to make laboratory studies of long-time tests of rail joints, the forms of joint bars, the manner of failure, wear of bar and rail fishing surfaces and the sources of such wear, the effect of repetitive loading, the life of joint bars under repetitive loading given by locomotive wheels and heavy cars and lighter wheel loads, with the number of applications causing failure for the various wheel loads used, and possibly, the determination of endurance limit loads for bars of different form and different materials.

The first rail joint to be put in the machine was made up of A. R. E. A. 36-in. heat-treated bars and 112-lb. rail. The initial bolt tension was set at 15,000 lb. per bolt. A positive bending moment of 400,000 in.-lb. and a companion negative moment of 200,000 in.-lb. were

applied each cycle. The calculated stress in the bars (not considering any initial clamping stresses) was about 40,000 lb. per sq. in. The joint failed at 634,000 cycles, equivalent to an application of 14,000,000 tons by this wheel load of 44,400 lb. The failure occurred by a fatigue crack starting at the base of one of the bars a little inside of the middle of the lower bearing surface, back about one-third inch from the rail end, a definite fatigue failure from tensile stress at the bottom of the bar.

In Test 2 a similar rail joint was tested with the same wheel load as used in Test 1. It failed at 479,000 cycles, equivalent to an application of 10,500,000 tons of the wheel load. This time the crack in the bar started back two inches from the rail end and progressed up from the base of the bar into the inner bolt hole, also a definite fatigue break at the bottom of the bar. The type of failure in the two joints was in all ways similar.

In Test 3 a smaller load was used, 35,500 lb., giving a positive bending moment of 320,000 in.-lb. and a negative amount of 160,000 in.-lb.—a 20 per cent reduction. As before, a bolt tension of 15,000 lb. was used. The joint failed at 1,501,000 cycles, equivalent to the application of 26,600,000 tons by the wheel load. The failure was similar to that of Test 2, a fatigue crack starting at the base about 1½ in. from the end of the rail and progressing upward into a bolt hole.

Test 4 involved the use of 24-in. bars in which a sizable fatigue crack had developed at the top fishing surface of the bars near the rail ends under traffic in track of the Denver & Rio Grande Western. This joint failed at 168,000 cycles (equivalent to the application of 3,700,000 tons by the wheel load of 44,400 lb.) by the extension of the fatigue crack in one of the bars vertically downward from the top. The large number of cycles applied to the bars in the testing machine upon their removal from track is indicative of the continued resistance of bars to fracture after they have become cracked in track.

In connection with the tests with the rolling-load testing machine, sets of systematic measurements are taken at appropriate intervals. These have brought out the definite need of information on the nature and variation of the material and its ability to withstand the various demands made upon it.

Properties and Failures of Joint Bars

Failure of joint bars in a laboratory rolling-load test at loads and stresses and cycles of loading which may seem somewhat smaller than some may have surmised for heat-treated carbon steel joint bars, raises questions concerning the quality of materials, endurance limit, cycles of loading to produce failure at stresses higher than the endurance limit, the manner of failure under repetitive loading, the injurious effects of high bearing pressures produced by bolt tension (clamping effects) and load, the effect of the softer decarburized metal at the surface of the bar and its surface roughness. Besides, does the material in the bars of the joints tested meet the best requirements available for the purpose, or is it possible to produce bars better fitted for the purpose? What is the situation with respect to the quality of joint bars?

In a discussion on the strength of rail joints, it must be understood that because of the variation in wheel loads to values above the nominal loads and by reason of imperfect supports and of imperfect bars and high initial stresses in the joint, intensified by unnecessarily high wrenching, the rail joint in track receives with considerable frequency the equivalent of far higher loads than the loads nominally talked about. In designing

joints, allowance should of course be made for these higher values which will be developed in track.

In choosing a wheel load on which to base the design of the strength required in a joint bar to meet the needs of traffic of a given kind, the question arises, whether the heavy driving wheel loads govern, or whether a more frequently applied wheel load of heavily loaded freight cars may influence failure to a greater degree? Also, if the still lighter wheel loads constitute a considerable proportion of the traffic, may not the total amount of these lighter loads be deducted from the annual tonnage in judging the amount of traffic which will cause fractural failures, and may not such lighter loads even give longer resistance to fracture? For a heavy traffic road, will wheel loads of 30,000 to 40,000 lb. constitute more than a small percentage of the total annual tonnage, and will not wheel loads of 20,000 to 25,000 lb. make up a much higher percentage and by their frequency thus control the stress which may cause fracture? As a rough guess the conditions of traffic and operation might be such as to cause the heavy driving wheel loads to furnish 5 per cent of the total tonnage, the medium wheel loads 20 per cent, and the lighter loads 75 per cent of the total tonnage. May not the high proportion of the still lighter loads add to the wear of joints, and thus avoid the presence of many fractural failures? To cite another probability, may the joint, by reason of its form or fit or material, so shirk its duty as not to carry its proper portion of rail stiffness and rail load, and thus by reason of its lower stresses continue in service until wear of parts causes replacements, its inefficiency meantime giving all the troubles of low joints? Actually, a joint is desired that will do its job as well as possible, even at the risk of breakage.

Commissioner Miller Again Urges Merger*

By Carroll Miller†

THE railroads are apparently drifting into government ownership, partly because of public apathy and partly because of the difficulties of the solution of the problem. Security holders, as well as railroad managements, seem mostly to have placed themselves in the defeatist class.

Many railroads are in good financial condition but others are on the verge of bankruptcy and still others are in bankruptcy, some of the latter being hardly able to make operating expenses. If the time comes when the income of the last class becomes consistently less than the outgo, they will be compelled to cease operation unless the government takes them over for reasons of national defense or otherwise in the public interest. If the weaker roads are thus taken over, it is questionable if the prosperous roads can continue on an independent basis. It would appear likely if the government is forced to assume ownership of any large system, that it will gradually, if not simultaneously, come into possession of all the railroads.

Government Railroads Don't Tolerate Competition

If the government is forced to take over the operation of the railroads, consideration must be given as to the effect on other types of carriers, both public and private,

* Abstract of a paper presented at Stevens Institute Annual Economics Conference, June 28.

† Interstate Commerce Commissioner.

because of the fact that government does not usually brook competition. For example, in European countries where the railroads are owned by the government, highway transportation appears to have been rather definitely restricted with a view to protecting the rail carriers against this type of competition.

Again, if the government were to take over the railroads under present depressed conditions, the Congress could scarcely justify paying more than a fraction of the par value of the outstanding securities for all of their properties. On the contrary, some interests may advocate government ownership with the expectation of receiving par, or better, for their securities.

In my judgment, consolidation of railroads is the only ultimate solution of the railroad problem and of the broader transportation problem, in so far as these problems can ever be finally solved. This is one of the many solutions proposed at this session in hearings before the Congressional Committees on pending transportation bills.

Legislation with regard to the transport situation generally is imperatively demanded by considerations of general public policy, in addition to that regarding consolidation. However, I am convinced that no substantial headway can be made, still less any permanent solution arrived at either in the railroad field or in the transportation area generally, without rail consolidation.

Obviously consolidation may be on the basis of either a limited number of systems or a single unified system. The President's Committee of three Interstate Commerce Commissioners in making recommendations for legislation proposed, among other things, that consolidation be considered. It recommended the creation of a temporary body of three members to deal with this and other problems. If such a body had started work a year ago under instructions to bring forward a plan for consolidating the railroads into one national system or a few large non-competitive systems and to prepare bills in accordance with its findings, some worthwhile consolidation legislation could have been enacted at this session of Congress. Had the office of Federal Co-ordinator been continued, perhaps some such legislation could have been passed before this session.

Consolidation into a limited number of non-competitive systems would undoubtedly be much more desirable than no consolidation at all. Nearly two years ago in an address before the National Association of Railroad and Utilities Commissioners at Salt Lake City, I advocated the complete unification of all the railroads of the country into one national system of transportation under private ownership. I do not intend by this statement to lay claim to any originality for the idea. Such a plan was proposed as early as 1891 by Collis P. Huntington, the then president of the Southern Pacific Railroad Company, and it has been advocated in a number of instances since that time.

There are many reasons which have led me to favor this plan. The first follows naturally from the fact that much of my professional life has been spent with public utility corporations, principally in the field of manufactured and natural gas. These utilities, in fact most utilities, are monopolistic enterprises. These enterprises have been frequently classed by economists as natural monopolies or as naturally monopolistic. Such competition as still remains in the gas and electrical utility business is, as a rule, of a substitutional rather than a horizontal character. In other words, gas and electric companies encounter competition from each other by way of the substitution of one service for the other but usually not from other companies in the same field.

Unlike the utilities, the railroads have been considered

primarily as competitive business enterprises. Historically and otherwise there has been an insistence upon the maintenance of a so-called competition even under regulation. This appears in the rigid anti-pooling clauses of the original act as well as in the requirements of the Act of 1920 that in a plan for the consolidation of the railroads of the United States "competition shall be preserved as fully as possible." It appears to me that competition between the railroads is one of the principal causes of transportation waste and has been largely instrumental in bringing so many of them to their present sorry financial condition.

The problem of making rates for utility corporations is a comparatively simple one. In the railroad field in contrast, not only are there numerous railroads offering both direct and circuitous service between the same points but one, two, or three substitutional services may be available. The problem is still further complicated by the fact that the rates for certain of these methods of transportation competing with the railroads are still not subject to adequate regulatory control. This fact alone greatly enhances the difficulties of railroad rate regulation.

Rates seldom can be changed without appreciably affecting the existing economic structure in one or more localities and, therefore, careful consideration must be given to the possible effect on economic conditions before any radical changes in rates are made. Our highly intricate rail rate structure is the result of thousands of adjustments built up in the continuing process of adapting it to constantly recurring economic changes. If the country as a whole is to be properly developed, the level of rail rates should generally be such that all shippers can reach common consuming markets on the basis of equality of rates, distance considered. If the principle of horizontal competition between rail carriers could be eliminated, through single system consolidation, many of the complications of the existing rail rate structure could be eliminated along with it.

The resulting unified system, by removing the so-called rate walls now existing between the different rate-making areas should produce a relatively simple and stable rail rate structure with no differently rated territories and uniform tariff classifications. Important consequences would be to remove the present incentive for railroads in certain sections to favor their shippers at the expense of the shippers and railroads in other sections, and to place competing shippers, respectively, upon a footing of equality. Any such extensive decrease in rate changes as compared with the present problem of adjusting the thousands of rates of the numerous independent rail carriers would also produce large economies not only for the carriers and shippers but also in the time and expenditures of the regulatory authorities.

The New "Ceiling" of Rates

The remaining part of the rate problem would then be primarily one of adjusting the rates of this unified rail transportation system to those charged by competing methods of transportation, such as the water lines, highway carriers, pipe lines, and air transport companies. This latter problem should be relatively simple for the reason that the cost basis of rate making would appear to be the only equitable method of making competitive rate adjustments. Rates of the unified rail transportation system and competing highway, water, pipe line, and air carriers would eventually be related to one another in accordance with the costs of these different carriers and their relative economy, efficiency and adaptability in performing the particular transportation services. In this

connection it has been pointed out that the ceiling or maximum of rates which a carrier should expect to receive for the performance of a service would be the cost to the shipper for performing the service for himself in vehicles owned by him or on the basis of contracts made by him with carriers for the performance of such transportation service.

Private carriage by highway and water is far in excess of that by common and contract carriers. This is another grave problem in transportation. Whether or not private carriage in interstate commerce should be restricted is another pending question.

One of the most obvious, as well as important, advantages of a single unified system of rail transport would be the enormous saving arising from the complete unification of railway plant and facilities. In other words, the single system would automatically bring about that very co-ordination now sought to be effected by the co-operation of independent railways through unified terminal operations, joint utilization of repair shops and facilities, the pooling of freight cars, passenger cars, and other rolling stock and equipment, the pooling of freight and passenger traffic, the unified handling of l. c. l. freight and the like.

At the present time the total transportation facilities of the country are far in excess of the available traffic. Consequently, all types of carriers are fighting strenuously with each other by rate cutting and other means to hold or increase their part of the business. At the same time the various railroads are likewise struggling vigorously with each other for their portion of such traffic as the railroads can hold or obtain.

In the last analysis, **the public receives no benefit, either in rates or service, from horizontal competition between railroads.** On the contrary, it pays heavily for the resulting duplication in service as well as in the economic waste due to the excessive number of routes over which much freight can and does move. Because of the existence of so many separate companies, traffic frequently moves over circuitous rather than direct routes. Intelligent management, in a single national railroad system, would obviously direct all traffic over the most direct and economical routes, thus giving the public improved service in terms of both more prompt delivery and lower cost. **Much of the activity of the railroad freight solicitor produces but few additional cars of freight for the railroad industry as a whole.** The solicitor frequently, if not usually, secures freight which would ordinarily, in any case, move by railroad. The aggregate cost of solicitation to the railroads runs into tens of millions of dollars annually, much of which could be saved by consolidating the railroads into one system.

Managements Spend Too Much

Time on Inter-R. R. Business

There is frequently a great diversity of interests and opinion among rail managements when any policy regarding rates is under consideration. As a rule, the roads involved naturally wish to present a united front whether in proceedings before the Interstate Commerce Commission or otherwise. The result is that much time and effort on the part of the managements is wasted in protracted negotiations before agreements on policy can be arrived at, if reached at all. In addition, railroad management must devote much of its attention to rail rate and allied controversies and litigation, consolidation, acquisition, and reorganization, financing and various regulatory proceedings related thereto or otherwise. Through consolidation, rail managements would be largely relieved of these burdens and the rail executives would be left free to de-

vote practically all of their time and attention to the economical transportation of freight and passengers. This, after all, is the real business of the railroads.

That our railroad system as a whole needs modernizing is conceded by all students of transportation. To modernize the American railroads would doubtless require the expenditure of many hundred million dollars in new and improved rolling stock and other additions and betterments, all of which would result in lower transportation costs. Such a large outlay, in addition to that for deferred maintenance, would stimulate the activity of our capital goods industries which, with agriculture, have lagged far behind all other industries in the recovery program. Mills and factories idle, or partially so, would again be active, resulting in an increased demand for agricultural products, which is also needed to make any recovery program a success.

Unification Would Increase N. R. O. I. 500 Millions

The annual savings by unification into one system have been variously estimated at from \$250,000,000 to \$1,000,000,000. Assume that approximately \$500,000,000 annually, which is considerably less than the average of these last two estimates, can be saved by consolidation into one system. If so, this saving would raise the average net operating income to \$1,178,000,000. This would be equivalent to a return of 5.89 per cent on \$20,000,000,000 instead of 3.39 per cent, the average of 1936 and 1937. More than this rate would, of course, actually accrue to the stock because the fixed interest and income bonds in the capital structure would manifestly call for much less interest than the earning rate of 5.89 per cent on the total investment. If such earnings can be maintained, the public will have a security of higher value and integrity than that of practically any existing railroad system. Thus, to raise money for capital expenditures, there should be no difficulty in selling any class of securities of the National Railroad System.

Government Should Indemnify Displaced Labor

The larger portion of the probable savings estimated above would be at the expense of labor. In answer to objections made on this score, I believe it will be to the decided welfare of the country for the federal government to take care of the displaced labor even on a full pay basis. It seems to me that the cost to the government would not be large because, in the aggregate, the number of men required for deferred maintenance work and construction might exceed the number displaced in the operating departments. Although some of the men displaced may not be fitted for certain classes of other work to be performed, the labor turnover should soon absorb this class. With the advent of better business conditions and the recovery of traffic lost to other means of transportation, employment by the unified system of railways should soon exceed that of 1936 for all the railroads.

Even if every railroad in the nation were earning a fair return on its investment, it is economically unsound for them to continue to compete with each other at great expense if consolidation into one system will effect substantial savings and better service. The ultimate result would be reduced rates and the movement of larger volumes of traffic.

If the railroads are not consolidated into one system or at least a few noncompetitive systems, under private ownership, it looks as though they are headed for consolidation into one system, under government ownership.

NEWS

No More Butter for the Biltmore?

Fletcher says I. C. C. could
scrimp supplies of hotel if
"straight jacket" passes

A Senate interstate commerce subcommittee headed by Senator Truman, Democrat of Missouri, began hearings on June 26 on S. 2610, the so-called "straight-jacket" bill to regulate outside investments of carriers, which was introduced last week by Senators Wheeler, Democrat of Montana and Truman. The bill, S. 2610 makes some minor changes and replaces S. 1310 which these Senators offered earlier in the session. The witnesses at the initial session, which was cut short due to a roll call vote in the Senate, were Chairman-designate Joseph B. Eastman of the Interstate Commerce Commission and his colleague, Commissioner Charles D. Mahaffie. Senator Truman announced at the beginning of the hearing that the committee hoped to expedite hearings so that action might be obtained on the bill at this session despite the fact that it is drawing to a close. He also announced that after hearing testimony on Monday, Tuesday, and Wednesday of this week, the committee would adjourn until July 10, when hearings would be resumed.

Mr. Eastman made a brief opening statement outlining the general scope of the measure and told the committee that Mr. Mahaffie, due to his intimate knowledge of the measure, would give a detailed analysis of it on behalf of the commission, which is sponsoring the legislation. Mr. Eastman explained that the bill would give the commission control over certain financial activities of the carriers which it does not now have. He went on to point out that in 1914 the commission had recommended the enactment of just such legislation but that nothing concrete had been done until this session. Senator Tobey, Republican of New Hampshire, and a member of the subcommittee, asked the witness, "Do you mean to say that the commission recommended this in 1914 and there has been no action on it until 25 years later?" "Yes," replied the chairman-designate, "that is the case. There have been many recommendations but no action until now."

Commissioner Mahaffie began his statement by saying that the principal purpose of the bill "is to prevent, in the future, the wasteful expenditure of carrier funds in purchasing securities or properties

Four-Months Net Deficit Was \$71,487,000

Class I railroads of the United States in the first four months of 1939 had a net deficit of \$71,487,000 after fixed charges, the Association of American Railroads announced on June 22. For the first four months of 1938, Class I roads had a net deficit of \$139,004,000 after fixed charges. For April, the net deficit was \$27,896,000, compared with one of \$33,267,000 in April, 1938.

which are unnecessary for the legitimate operation of carrier business." He then went on to point out that the bill seeks to guard against the recurrence of these abuses in three ways. First, he said, it supplements and clarifies the commission's authority with respect to the accounts and records of carriers, and extends some of its powers to cover subsidiaries, holding companies, and other enterprises such as banks, brokerage houses, and equipment companies, which frequently engage in transactions with carriers.

Secondly, the commission, according to the commissioner, is given power to supervise the issuance of securities by subsidiaries of railroads. And thirdly, the bill subjects to the control of the commission the expenditure of carrier funds for securities or properties which have no immediate relation to the operation and maintenance of existing carrier facilities. He went on to add that the desirability of legislation to accomplish these purposes has been repeatedly stressed in the annual and special reports of the commission.

Commissioner Mahaffie was then granted permission to file a lengthy statement which showed how in the past various carriers have invested some of their surplus funds in other than railroad securities, often with detrimental effects to the carriers involved. Many excerpts from annual and special reports of the commission were included in the statement showing how that body had repeatedly counseled against the practices which this bill would try to correct.

At the conclusion of his general statement of the bill Mr. Mahaffie disposed of the argument that it would be undesirable at this time to place the railroads under new regulatory restrictions by saying that "We have little sympathy with the view that the railroads or other carriers are overburdened with governmental supervision, or that regulation has contributed to

(Continued on page 51)

Retirement Board Probes Annuities

Study of employee benefits
shows Act changes brought
rise in disability pay

The weekly review of the Railroad Retirement Board announces the fact that the Board has just completed an analysis of new certifications of employee annuities for the current fiscal year according to the type of annuity. The article goes on to point out that employee annuities are divided, according to the provisions of the Railroad Retirement Act, into two groups each of age and disability annuitants.

The age annuitants are separated according to whether or not the annuitant is at least 65 years of age at the time the annuity begins to accrue. Age annuitants who are less than 65 years of age must have at least 30 years of credited service, and the amount of the annuity is reduced at the rate of $\frac{1}{180}$ for each calendar month during which the annuitant is under 65 at the time the annuity begins to accrue.

Disability annuitants are divided according to whether or not they have 30 years of credited service. Those who have less than 30 years must be at least 60 years of age when the annuity begins to accrue, and in such cases the amount of the annuity is reduced as for age annuities of employees less than 65.

The survey shows that from the beginning of operation through May 31, 1939, the Board had certified 98,536 annuities of which 84.4 per cent were old age annuities and the remainder disability annuities. To June 30, 1938, 91.2 per cent of the 65,683 employee annuities certified were age annuities and 8.8 per cent disability annuities. Of the total of 32,853 employee annuities certified between July 1, 1938, and May 31, 1939, 70.5 per cent were age annuities and 29.5 per cent disability annuities.

Between July 1, 1938, and May 31, 1939, 63.5 per cent of all employee annuities were age annuities for persons 65 and over, seven per cent for persons under 65, and 19.1 per cent disability annuities for persons with 30 years of service and 10.4 per cent disability annuities for persons with less than 30 years of service; the corresponding percentages for the preceding period were 97.5 per cent, 3.7 per cent, 7.5 per cent and 1.3 per cent.

The weekly review goes on to say that the percentage of age retirements for employees less than 65 years of age would

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5 Months N. O. I. Was \$126,167,043

1.5 per cent return compares
with \$46,025,993 or 0.55
per cent last year

Class I railroads of the United States in the first five months of 1939 had a net railway operating income of \$126,167,043 which was at the annual rate of return of 1.50 per cent on their property investment, according to the Bureau of Railway Economics of the Association of American

The Eastern district net for the first five months was \$79,917,318, or 1.76 per cent; for the same period in 1938, it was \$35,119,857 or 0.77 per cent; while in 1930 it was \$177,734,373 or 4.15 per cent. Gross in the Eastern district for the first five months in 1939 totaled \$725,386,077 an increase of 12.2 per cent compared with 1938, but a decrease of 35.4 per cent compared with 1930. Operating expenses totaled \$549,785,629, an increase of 5.9 per cent above the same period in 1938, but a decrease of 35.4 per cent under the first five months of 1930.

Class I roads in the Eastern district for the month of May had a net railway oper-

CLASS I RAILROADS—UNITED STATES

Month of May

	1939	1938	1930
Total operating revenues	\$302,617,948	\$272,609,400	\$457,254,022
Total operating expenses	237,411,054	217,054,008	347,604,651
Taxes	28,831,347	28,350,831	30,532,352
Net railway operating income	25,100,765	16,665,684	67,790,336
Operating ratio—per cent	78.45	79.62	76.02
Rate of return on property investment	1.32	0.87	3.41

Five Months Ended May 31

Total operating revenues	\$1,482,509,821	\$1,353,986,368	\$2,218,877,128
Total operating expenses	1,158,958,505	1,113,461,692	1,717,945,937
Taxes	142,900,527	140,655,147	146,785,356
Net railway operating income	126,167,043	46,025,993	301,732,780
Operating ratio—per cent	78.18	82.24	77.42
Rate of return on property investment	1.50	0.55	3.51

Railroads. In the first five months of 1938, their net railway operating income was \$46,025,993 or 0.55 per cent on their property investment, and in the first five months of 1930, their net railway operating income amounted to \$301,732,780 or 3.51 per cent.

Class I railroads in May, 1939, had a net railway operating income of \$25,100,765 or 1.32 per cent on investment compared with \$16,665,684 or 0.87 per cent in May, 1938, and \$67,790,336 or 3.41 per cent in May, 1930.

Gross operating revenues for the first five months of 1939 totaled \$1,482,509,821 compared with \$1,353,986,368 for the same period in 1938, and \$2,218,877,128 for the same period in 1930, an increase of 9.5 per cent in 1939 above 1938, but 33.2 per cent below 1930. Operating expenses amounted to \$1,158,958,505 compared with \$1,113,461,692 for the same period in 1938, and \$1,717,945,937 for the same period in 1930—4.1 per cent more than the former, but 32.5 per cent below 1930.

Class I railroads in the first five months of 1939 paid \$142,900,527 in taxes compared with \$140,655,147 in the same period in 1938, and \$146,785,356 in the same period in 1930. The May tax bill amounted to \$28,831,347, an increase of \$480,516 or 1.7 per cent above May, 1938. Thirty-five Class I railroads failed to earn expenses and taxes in the first five months of 1939, of which 12 were in the Eastern district, 6 in the Southern district, and 17 in the Western district.

Gross for May amounted to \$302,617,948 compared with \$272,609,400 in May, 1938, and \$457,254,022 in May, 1930; operating expenses in May totaled \$237,411,054 compared with \$217,054,008 in the same month in 1938, and \$347,604,651 in May, 1930.

ating income of \$13,709,085 compared with \$11,633,714 in May, 1938, and \$43,275,323 in May, 1930.

In the Southern district the five-months net railway operating income was \$27,334,825 or 2.03 per cent. For the same period in 1938, it amounted to \$18,573,385 or 1.39 per cent, and for the same period in 1930 was \$38,895,434 or 2.76 per cent. Gross in the Southern district for the five months amounted to \$208,650,871, an increase of 7.1 per cent compared with the same period in 1938, but a decrease of 28.6 per cent under the same period in 1930. Operating expenses in the first five months of 1939 totaled \$156,331,900, an increase of 3.2 per cent above the same period in 1938, but a decrease of 31.8 per cent under 1930.

Class I railroads in the Southern district for May had a net of \$4,333,914 compared with \$3,663,934 in May, 1938, and \$6,010,550 in May, 1930.

The Western district net for the five months was \$18,914,900 or 0.75 per cent; for the same period in 1938 those same roads had an operating deficit of \$7,667,249, but in 1930 they had a net railway operating income of \$85,102,973 or 2.92 per cent on investment. Gross in the Western district for the first five months amounted to \$548,472,873, an increase of seven per cent above the same period in 1938 but a decrease of 31.8 per cent below the same period in 1930. Operating expenses totaled \$452,840,976, an increase of 2.2 per cent compared with the same period in 1938 but a decrease of 29 per cent under the same period in 1930.

For May alone the Class I railroads in the Western district had a net railway operating income of \$7,057,766 compared with \$1,368,036 in May, 1938, and \$18,504,463 in May, 1930.

O.K. "Mama's Baby" Bill for Water Lines

House water lines' fan commit-
tee recommends "regulation"
by Maritime Commission

The House Merchant Marine and Fisheries committee has ordered a favorable report on H. R. 4307, a bill introduced by Representative Bland, Democrat of Virginia, which provides for the regulation of inland water carriers. The bill, which has been redrafted, exempts contract water carriers from Federal regulation, but provides for the regulation of all other water carriers in domestic trades, including the Great Lakes. Regulation would be by the Maritime Commission, but its minimum rate powers would not extend to the Great Lakes, although its maximum rate authority would.

The bill provides for a joint board of two representatives from the Interstate Commerce Commission, and two from the Maritime Commission, with a fifth member, the chairman, to be named by the President. The joint board would investigate the need for any changes or promotional work in any of the rail, motor or water trades, and would have jurisdiction over all proceedings involving more than one type of transportation. Chairman Bland of the committee hopes to offer the bill to the House before it begins consideration of the general transportation bill.

Representative Snyder, Democrat of Pennsylvania, has introduced in the House H. R. 6939, a bill prescribing tolls to be paid for the use of locks on all rivers in the United States. The bill provides that there shall be paid for the use of all government-built, -owned, and -operated locks on all rivers in the United States a toll at the rate of one cent per long ton of freight for each lock through which such freight is transported. The tolls would be collected by the Secretary of the Treasury and would be turned into the general fund of the Treasury.

Representative Fulmer, Democrat of South Carolina, has offered H. R. 6958, a bill making numerous amendments to the United States Warehouse Act.

Senator Truman, Democrat of Missouri, has introduced in the Senate S. 2654, a bill which would amend section 77 of the Bankruptcy Act by giving claims for personal injuries to railroad employees, and claims of personal representatives of deceased employees, a preferred status and directing their payment out of assets as "operating expenses."

The Senate has passed and sent to the President the Tax Revision Bill of 1939 which was passed by the House last week and details of which were given in last week's issue. As pointed out last week, the measure will allow railroads in an unsound financial condition to purchase their bonds at less than par without having to pay a tax on the difference between the par value and the purchase price.

The Senate interstate commerce committee on June 23 was discharged from

further consideration of S. J. Resolution 81, which provides for the liquidation of the Inland Waterways Corporation and the Warrior River Terminal Company. The resolution was referred to the committee on commerce for consideration.

Despite the fact that the Secretary of War and the Secretary of Agriculture opposed the bill, the Senate Commerce Committee has favorably reported S. 1989, with amendments, a bill providing for the apportionment of costs of alterations of bridges over navigable waterways between the United States and the owners of such bridges. The legislation had been sought by the railroads to relieve them of the burden of making alterations in their bridges made necessary by improvements in waterways for the purpose of navigation.

The bill provides that the bridge owner shall bear such part of the cost as is attributable to the direct and special benefits which will accrue to the bridge owner as a result of the alteration, and the United States shall bear the balance of the cost. The committee adopted an amendment which provides that in such direct and special benefits shall be included additional length of life or period of usefulness of a bridge and that in apportioning the cost due allowance to the bridge owner shall be made for the present value of the bridge replaced at the time of replacement. Another provision was made for agreements between the Secretary of War and bridge owners for relocation or construction of new bridges where held to be preferable to an alteration of an existing bridge, under the basis of apportionment prescribed. The amendment provides, however, that nothing in the bill shall be construed as requiring the United States to pay any part of the expense of building any bridge across a navigable stream which the Secretary of War shall not find to be, in fact, a relocation of an existing bridge.

New York Central Installs "Roomettes" on Detroit

The New York Central has placed new roomette sleeping cars, similar to those now operated on the Twentieth Century Limited, each containing ten roomettes and five double bedrooms, in service on the Detroit in both directions, between New York and Detroit, Mich., effective June 26.

Status of R. F. C. Rail Loans

The monthly statement of the Reconstruction Finance Corporation as of May 31, showed disbursements to railroads of \$646,843,461 and repayments of \$210,231,357. Chairman Jesse Jones announced that since the R. F. C. resumed lending during February, 1938, it had authorized 33 loans to railroads in the total amount of \$151,711,112.

Fourth Section Relief for Pullman

The Interstate Commerce Commission, Division 2, has granted the Pullman Company relief from the aggregate-of-intermediates provision of the Interstate Commerce Act's fourth section in connection with the 10 per cent reduction in one-way upper berth rates between points in Eastern territory on the one hand and other

Canadian Railroaders Rap St. Lawrence Ditch

Development of the St. Lawrence seaway would not benefit Canadian farmers but would benefit manufacturers in the United States who would obtain cheap power to compete with Canadian manufacturers, members of the Affiliated Railway-men's Organizations of Ontario, contended in a brief submitted last week to C. D. Howe, minister of transport at Ottawa.

The brief, dealing with a number of the major points in the railway problem, pointed out that \$50,000,000 worth of business was being diverted from the railways annually by highway agencies.

Mr. Howe expressed keen interest and stated definitely that the deep waterway was not a subject of interest to the government of Canada at the present time.

points in the United States and Canada on the other.

Labor and Management to Confer on Adjustment Board Problem

Representatives of the Association of American Railroads and the Railway Labor Executives Association will hold a joint meeting in Washington, D. C., on June 30 to discuss their views on the operation of the Railway Labor Act and the Railway Adjustment Boards in particular. The meeting was arranged after the railroad labor representatives became alarmed at what they believe to be a concerted attack by the carriers on the adjustment board feature of the act.

Court Settles Ten-Year N. P. Land Grant Case

The ten-year-old Northern Pacific land grant case was disposed of on June 28 when the district court at Spokane, Wash., signed a decree dividing the land almost equally between the government and the railroad. The division returned to the government 1,363,000 acres which the railroad asserted was part of the grant and gave to the railroad 1,350,000 acres which the government contended should remain part of the public domain. The railroad was denied the right to 315,000 acres in the Crow Indian reservation.

Shriners Put Up in Pullmans at Baltimore Jamboree

Fixed living quarters ran out when almost 50,000 Shriners invaded Baltimore, Md., for their national convention, June 27 to 29, inclusive, and some 1500 of the Nobles were given living quarters in four Pullman car "towns" set up on Pennsylvania and Baltimore & Ohio trackage. At time of writing, about 75 sleepers had been assigned to B. & O. tracks at Mount Royal and Camden station ("Camden Arms") and the Pennsylvania at its main station and the Bolton street yard, and set up as living quarters. Night shift workers as-

signed in these areas were requested to "tip-toe" about their duties so as not to awaken their guests and switching was conducted with unusual delicacy.

Ralph Budd Placed on Advisory Committee of Standards Association

Ralph Budd, president, Chicago, Burlington & Quincy, has been named as a member of the executive advisory committee of the American Standards Association. The advisory committee is the final step of the association in a program to bring first-line executives into the national standardization program and creates a body of 13 outstanding industrialists who will comprise the final source of advice on major problems. Membership of the committee also includes A. W. Robertson, chairman, Westinghouse Electric & Manufacturing Co.; Alfred P. Sloan, Jr., chairman, General Motors Company, and E. R. Stettinius, Jr., chairman, United States Steel Corporation.

I. C. C. Appoints District Director

The Interstate Commerce Commission has selected as district director in charge of its Charlotte, N. C. office, Theodore G. Reynolds to succeed Sam C. Blease, whose resignation has been received. Mr. Reynolds will be acting district director until August 1, on which date he will become district director.

Mr. Reynolds entered the Bureau of Motor Carriers as District Supervisor on June 1, 1936. He was formerly employed by motor freight carriers in the capacity of solicitor and terminal operator and as general agent. He has had experience extending over several years in the various phases of motor carrier operations, according to the commission's announcement. During his service in the Bureau of Motor Carriers, he has been assigned to the Pittsburgh office.

Truckers Holler—So I. C. C. Holds Up N. H. Rate Reduction

Schedules whereby the New York, New Haven & Hartford proposed to reduce rates and increase minima on mixed carloads between Boston, Mass., and points grouped therewith, and Harlem River, N. Y., have been suspended by the Interstate Commerce Commission from June 23 to January 23, 1940. The New England Motor Freight Bureau protested against the tariffs which proposed to reduce the Boston-New York rate on mixed carloads from 33 cents per 100 lb. to 25 cents per 100 lb. and raise the minimum weight from 24,000 lb. to 30,000 lb.

The commission has docketed the case as I. & S. Docket No. 4656, and set July 17 as the date for hearing before Examiner Treazise at the Hotel Lenox, Boston, Mass.

Hearings Held on Pension Liberalization Measures

Hearings were begun on June 26 before a Senate interstate commerce subcommittee headed by Senator Stewart, Democrat of Tennessee, on 10 bills, S. 306, 326, 969, 1112, 1121, 1724, 1784, 1828, 2159, and

2443, all bills aimed at the liberalization of the present Railroad Retirement Act. Witnesses appearing at the hearing were Herman L. Ecker, who appeared at the request of Senator La Follette, Progressive of Wisconsin, and James L. Cosgrove, president of the Railroad Employees National Pension Association.

The attempts to liberalize the present pension act will be fought by the Association of American Railroads and the Railway Labor Executives Association, who are of the opinion that the present act is working out satisfactorily and that it should be given a further trial before attempts are made to amend it.

I. C. C. Disallows Reduced Rates for C. C. C. Boys

Division 3 of the Interstate Commerce Commission has found not justified the proposed establishment of reduced passenger fare for exclusive use of enrollees of the Civilian Conservation Corps traveling on furlough or leave at their own expense. Schedules naming these fares were ordered canceled by the commission and the proceeding discontinued.

Commissioner Alldredge disagreed with his colleagues on Division 3, Commissioners Mahaffie and Miller, expressing the view because C. C. C. enrollees are, in his opinion, "destitute," the reduced rates of one cent per mile should be accorded them. He went on to argue that because the Interstate Commerce Act permits free passage to "destitute" persons, it should be so construed as to permit the carriers to offer reduced rates, to such individuals.

A. S. M. E. Officers Nominated

Nominees for officers of the American Society of Mechanical Engineers for 1940 were announced at a recent meeting of the nominating committee held at State College, Pa. Nominees presented are: President—W. H. McBryde, consulting engineer, San Francisco, Cal.; Vice-presidents—K. H. Condit, consulting editor, American Machinist, New York; F. Hodgkinson, professor of mechanical engineering, Columbia University, New York; J. C. Hunsaker, head of department of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass.; K. M. Irwin, assistant to vice-president in charge of engineering, Philadelphia Electric Co., Philadelphia, Pa.; Managers—J. W. Eshelman, president, Eshelman & Potter, Birmingham, Ala.; L. Helander, head of mechanical engineering department, Kansas State College, Manhattan, Kans.; G. T. Shoemaker, president, United Light & Power Service Co., Chicago, Ill.

"Fan" Trip to Use Old 4-4-0 Locomotive

An old 8-wheeler of the Delaware, Lackawanna & Western will haul a party of railroad "fans" in a train consisting of a combination car, a diner, three coaches and an open gondola car on a special excursion on July 9 out of New York. The itinerary includes a run from Hoboken, N. J., over the Lackawanna to Morristown, N. J., where a side trip will be

"Let's Keep the Record Straight" in Pictures

The Association of American Railroads has prepared a new sound slide film entitled "Let's Keep the Record Straight." Running about 30 minutes and containing 150 photographs, cartoons and drawings, the film, in a conversational and informal manner presents the differences between railroad and motor truck employment, wages, subsidies, taxation and services. Sam Jones, veteran railroad station agent and principal character in the film, declares "the railroads just can't take it—certainly not without presenting their side of the story—and doing everything they can do to keep the record straight;" then using the trucking interests' own figures, he proceeds to point out the flaws in them. The cast also includes two brothers, Jim, who is attorney for a local truck line, and Jack, who is employed as a bridge engineer by a local railroad. The two argue over the merits of the two modes of transportation represented by each, and it requires the logic of Sam to keep the two of them straight in their thinking on the subject. Thereby hangs the tale.

made over the Morristown & Erie to Essex Fells and return. The train will then proceed to the engine terminal at Port Morris, N. J., thence over the Sussex branch and the Lehigh & Hudson River to Warwick, N. Y. After inspection of L. & H. R. facilities, it will proceed over the L. & H. R. to Belvidere and the Pennsylvania to Easton, Pa., back to the Lackawanna at Phillipsburg, N. J., and return to Hoboken. The trip has been priced at \$3.75 and accommodations are limited to 150 persons.

Jones and Carmody to Head New Agencies

President Roosevelt has sent to the Senate for confirmation the names of Jesse H. Jones of Texas to be Federal Loan Administrator and John M. Carmody of New York, to be Federal Works Administrator, effective July 1. Mr. Jones, whose appointment has been ratified is at present the chairman of the Reconstruction Finance Corporation; he will head the new loan agency which will include the work of the R. F. C. Mr. Carmody, who now heads the Rural Electrification Administration, will administer the new works agency which will take over, among other things, the activities of the Bureau of Public Roads which is now a part of the Department of Agriculture. As pointed out in the *Railway Age* for June 17, page 1051, both of the President's reorganization plans will go into effect on July 1.

Acting under terms of President Roosevelt's reorganization order No. 2, Secretary of the Interior Ickes, on June 23, created a Coal Division in the Department of the Interior to take over the af-

fairs of the present National Bituminous Coal Commission on July 1. The new division will be headed by a director yet to be appointed.

K. C. S. Seeks to Operate Air Line

The Kansas City Southern Transport Company, wholly-owned subsidiary of the Kansas City Southern, has applied to the Civil Aeronautics Authority for a certificate to operate an air service between Kansas City, Mo., and New Orleans, La. In its application the company said that it plans to increase its present capital of \$25,000 to \$300,000, if its petition is approved, and purchase three Lockheed Super-Electra 14-passenger planes, two to be used regularly on the route and the third to be held in reserve.

The company proposes to make two flights daily between the terminal points, one southbound and one northbound, with stops at Joplin, Mo.; Fort Smith, Ark.; Texarkana, Shreveport, Alexandria, and Baton Rouge, La. In addition to airways radio, the company proposes to use Kansas City Southern telephone circuits for its operations. The flight, which covers a distance of 759 miles, will be made in about six hours. The petition asked for authority to transport "persons, property and mail."

Senate Committee O. K.'s Forwarding Probe

Senator Wheeler, Democrat of Montana, and Senator Reed, Republican of Kansas, have favorably reported to the Senate S. Res. 146, which would authorize the Senate committee on interstate commerce or any subcommittee to make a full and complete investigation of freight-forwarding companies and the possibilities of improving methods of handling certain classes of traffic. Although the resolution carries no appropriation, it does authorize the interstate commerce committee or any subcommittee to request clerical or expert assistance from the executive departments, the Interstate Commerce Commission, or other government agencies.

In the report accompanying the resolution, it is pointed out that there has been "a consistent and vigorous demand from all interested parties for such a study as is provided by Senate Resolution 146". The report goes on to say that the American Trucking Association has urged such a study and freight forwarding regulatory legislation. Certain forwarding companies, it is added, have endorsed the study and the I. C. C. has already devoted considerable time and thought to the problem of regulating freight-forwarding companies. The report concludes by adding that at the present time proposed freight-forwarding legislation is pending before the House interstate and foreign commerce committee. The resolution will be placed on the Senate calendar for action by that body. Indications are that it will be adopted at an early date.

I. C. Motor Trucks Relieve Its Trains of L. C. L.

Motor trucks will be employed by the Illinois Central, beginning June 27, to relieve its local freight trains from handling

1. c. 1. shipments on all main and branch lines in an area bounded by Centralia, Ill., on the north, Cairo on the south, Eldorado on the east and East St. Louis on the west. Under the plan, merchandise destined to any one of the 66 Illinois Central freight stations in this area will be moved in carloads to Carbondale. Those from Chicago will leave on a fast train at 7:45 p. m. and arrive at Carbondale at 2:50 a. m. Evening shipments from St. Louis will reach Carbondale shortly after midnight. Immediately upon arrival at Carbondale the contents of the freight cars will be loaded into waiting motor trucks, rented from the Railway Express Agency, and by 5:30 a. m. the trucks will be under way to make deliveries to Illinois Central local freight stations. In the afternoon the trucks will reverse their routes, returning to Carbondale for evening connections with fast freight trains in all directions. The arrangements which have been in effect for optional pickup and delivery service to and from shippers near local stations will be continued, affording door-to-door service for those who desire it.

Merchandise service will be improved by reducing the time in transit as much as 48-hr. in some instances. Carload service will be improved by making it possible for local freight trains to get over the road in less time. Every one of the 66 freight stations on the Illinois Central in southern Illinois will have overnight service to and from Chicago and St. Louis—a service which heretofore has been available only at the larger cities in this area.

May Locomotive Shipments; Rail Shop Orders Shown

The May issue of the Bureau of Census monthly statement covering shipments of railroad locomotives published for the first time a table showing locomotive building in railroad shops. These data for Class I roads were furnished by the Car Service Division, Association of American Railroads; they cover "locomotives made in railroad shops, new or rebuilt and written

into property accounts, placed in service during the month."

During the first five months of this year the Class I roads built 24 locomotives in their own shops, including seven steam and 17 electrics; three of the steam locomotives were built in May while at the close of that month there were unfilled shop orders for 21 locomotives, all steam.

Meanwhile the statement also carries its usual tabulation of shipments and unfilled orders, based on reports received from the country's principal builders. Those reports showed May shipments totaling 22 locomotives as compared with 20 in April and 21 in May, 1938. The total for the first five months of this year was 105 as compared with 151 in the same period last year and 173 in 1937. The 22 locomotives shipped from the builders' plants in May included 19 Diesel-electrics and two electrics for domestic service and one steam for export; the 105 shipped during this year's first five months included 89 Diesel-electrics, six electrics, two steam-electrics and three steam for domestic service and five steam for export. At the close of May the builders had unfilled orders for 174 locomotives, including 60 steam, 33 electrics and 72 Diesel-electrics for domestic service and three steam, four electrics and two Diesel-electrics for export; on May 31, 1938, there were unfilled orders for 83 locomotives, including 38 steam, 21 electrics and 15 Diesel-electrics for domestic service and nine steam for export.

Freight Car Loading

Loading of revenue freight for the week ended June 24 totaled 642,987 cars, the Association of American Railroads announced on June 29. This was an increase of 5,114 cars, or eight-tenths of one per cent, above the preceding week, an increase of 84,199 cars, or 15.1 per cent, above the corresponding week in 1938, but a decrease of 126,958 cars, or 16.5 per cent, below the same week in 1937.

As reported in last week's issue, the loadings for the previous week ended June

17, totaled 637,873 cars, and the summary for that week, as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loadings			
For Week Ended Saturday, June 17			
Districts	1939	1938	1937
Eastern	132,801	114,372	155,096
Allegheny	122,350	101,563	158,374
Pocahontas	46,102	35,250	46,652
Southern	90,908	83,938	101,501
Northwestern	98,643	78,758	126,607
Central Western	102,197	96,008	111,251
Southwestern	44,872	45,630	53,306
Total Western Districts	245,712	220,396	291,164
Total All Roads	637,873	555,519	752,787
Commodities			
Grain and Grain Products	38,821	36,568	31,017
Live Stock	9,457	10,064	10,395
Coal	100,972	82,780	112,917
Coke	5,809	4,151	9,676
Forest Products	30,550	26,592	39,272
Ore	40,696	24,740	72,109
Merchandise l.c.l.	152,502	146,308	168,250
Miscellaneous	259,066	224,316	309,151
June 17	637,873	555,519	752,787
June 10	634,597	553,854	750,500
June 3	567,732	502,617	688,987
May 27	627,674	562,076	790,503
May 20	615,966	545,789	775,074

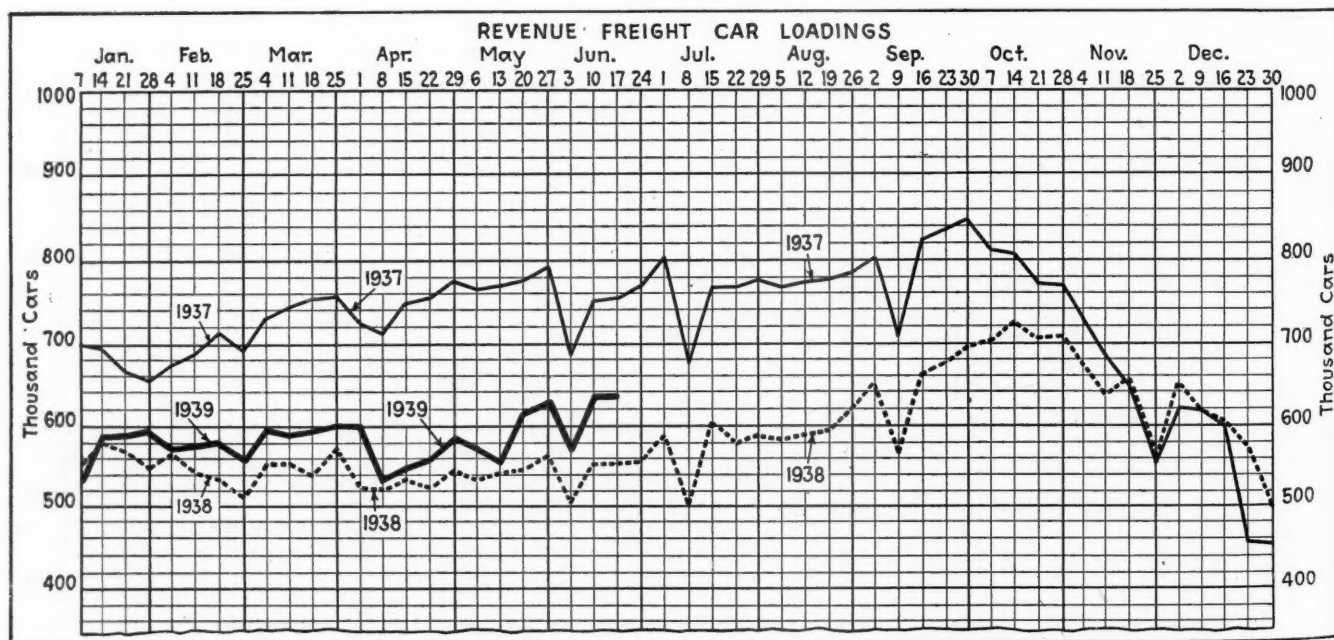
Cumulative Total,
24 Weeks.....14,034,607 13,082,964 17,467,884

In Canada.—Carloadings for the week ended June 17 totaled 43,888, as compared with 42,497 in the previous week and 43,289 last year, according to the weekly statement of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
June 17, 1939.....	43,888	21,180
June 10, 1939.....	42,497	20,042
June 3, 1939.....	43,935	18,615
June 18, 1938.....	43,289	18,789
Cumulative Totals for Canada:		
June 17, 1939.....	1,024,298	536,040
June 18, 1938.....	1,057,753	505,354
June 19, 1937.....	1,139,208	674,554

Corrects Report on Retirement Board Ruling

The June 15 issue of the "Weekly Review" put out by the Railroad Retirement Board's Bureau of Research and Informa-



tion Service publishes a correction of an error which occurred in an item in the previous issue dealing with the creditability of service rendered under contracts between the Cleveland, Cincinnati, Chicago & St. Louis and the Railway Service & Supply Company. The correction states that the item, which was noted in the *Railway Age* of June 17, page 1053, should have read as follows:

The Board approved the opinion of the General Counsel that service rendered under two contracts between the Cleveland, Cincinnati, Chicago & St. Louis Railway Company and the Railway Service & Supply Corporation, dated February 28, 1922, and March 20, 1922, respectively, and supplements thereto, covering the operation of the railway company's freight car and locomotive repair shops at Beach Grove and Brightwood, Indiana, is creditable toward annuities under the Railroad Retirement Acts as service to the railway company from March 1, 1922, to March 31, 1925, with respect to service rendered under the contract of February 28, 1922, and supplement thereto, covering the operation of the freight car repair shops at Beach Grove and Brightwood, and from March 15, 1922, to July 19, 1924, with respect to service rendered under the contract of March 20, 1922, and supplement thereto, covering the operation of the locomotive repair shops at Beach Grove.

"Flying Yankee" Borrowed for Summer "Mountaineer" Service

The Boston & Maine-Maine Central inaugurated a new service between Boston, Mass., and White Mountain resorts in New Hampshire June 23, using the Diesel-electric streamliner "Flying Yankee" for the service. A preview run was made June 22 bearing a party of 125 officers of the Boston & Maine and Maine Central, directors and officials of the New England Council, members of the White Mountain Region Association of Hotel Men and other guests. Included in the celebration was an automobile tour to the base of Mt. Washington and a ride on the cog railway.

For use in the new service the "Flying Yankee" will give over its present mid-day run from Boston to Bangor, Me., and its early evening run from Bangor to Boston to a Diesel-electric powered air-conditioned train of coaches and a dining car, but will continue to operate as before, a daily round trip, between Boston and Portland, Me. It is being taken off the Bangor run for the summer because, as the railroads' statement reads, "it is of insufficient size to handle the patronage which is offered and we had to turn away many passengers on these two particular Maine runs last summer."

As the "Mountaineer," the Flying Yankee equipment will leave Boston daily except Sunday and Monday at 11:30 a. m. (e.s.t.) and arrive at Whitefield, N. H., at 3:35 p. m., with stops at Mt. Whittier, North Conway, Intervale, Glen & Jackson, Bartlett and Fabyan. Sunday only it leaves Boston at 8 a. m. and arrives at Whitefield at 12:05 p. m. In the other direction it runs daily except Monday leaving Whitefield at 6:05 p. m., arriving in Boston at 10 p. m. The service is scheduled to continue until September 9 when it is expected that the Bangor run of the Flying Yankee will be restored.

Canadian "Royal Train" Locomotives Now at N. Y. World's Fair

The Canadian locomotives which hauled the royal train in the Dominion—Canadian National No. 6400 and Canadian Pa-

cific No. 2850—have arrived at the railroad area at the New York World's Fair and were formally placed on exhibit on Dominion Day, July 1. Finished in royal blue and silver to harmonize with the royal train, the two locomotives have been carefully shopped and prepared for exhibition to the American public.

C. N. R. No. 6400 is 94 ft. long with tender and weighs in excess of 650,000 lb. It left Montreal, Que., on June 16 and traveled under its own steam over the Central Vermont to Springfield, Mass., where, owing to weight limitations and clearance conditions, its tender was emptied of water and coal and the locomotive dead-headed the remainder of the distance to the fair. During the trip down through New England brief stops were made to give Americans the opportunity of inspecting what is said to be the largest locomotive in the British empire. In St. Albans, Vt., a broadcast was sent out over a hook-up covering the entire New England territory.

C. P. R. No. 2850 was one of 20 of the same series constructed in 1929 and 1930. For the purpose of hauling the royal train it was redecorated with a semi-streamlined front bearing the royal arms over the headlight. After a check-up at the Angus shops, the 2850 hauled its regular train to Toronto, Ont. Thence it ran light over the Toronto, Hamilton & Buffalo to Welland, Ont., Michigan Central to Suspension Bridge, N. Y., New York Central main line to Rochester, N. Y., West Shore and Boston & Albany to Chatham, N. Y., Harlem division of the New York Central to New York, New York, New Haven & Hartford over Hell Gate bridge and Long Island to the fair grounds. Both locomotives will appear in the final scenes of the opera-pageant "Railroads on Parade."

I. C. C. Rate Orders

The Interstate Commerce Commission, on June 24, suspended from June 26 until September 24, the operation of all schedules as published in supplement No. 4 to tariff MF-I. C. C. No. 63 of the National Automobile Transporters Association, Agent, Detroit, Mich.

The suspended schedules propose to reduce from \$37.50 to \$33.90 per vehicle, the truckload commodity rate on passenger vehicles, wheel base up to and including 115 inches and freight vehicles, capacity up to and including one and one-half tons, minimum four vehicles (except that when dimensions of the vehicles prohibit the loading of four vehicles, the minimum will be three vehicles) applicable between St. Louis, Mo., and Texarkana, Tex.

Division 3 of the Interstate Commerce Commission has found in the case of the Standard Oil Company of Louisiana v. Abilene & Southern et al. that rates on refined petroleum products, asphalt and road oil, in carloads, from refineries in the New Orleans-Baton Rouge district in Louisiana to destination in Oklahoma, Kansas, Nebraska, South Dakota, Colorado, and Wyoming are not unreasonable and has dismissed the complaint.

The Interstate Commerce Commission has suspended from June 28, until Janu-

ary 28, 1940, the operation of certain schedules proposing to establish reduced rates on freight of all kinds, in straight or mixed carloads, from St. Louis, Mo., and East St. Louis, Ill., to Pensacola, Fla., to meet motor-truck competition.

Jeffers' Boyhood Home Becomes Memorial

William M. Jeffers, president of the Union Pacific, has given his boyhood home to North Platte, Neb., and the city will



The Boyhood Home of William M. Jeffers, President of the Union Pacific, in North Platte, Neb., Will Become a Museum and Memorial in Cody Park

move the building to Cody Park in that city where it will become a museum and a memorial to Mr. Jeffers. Tentative plans provide for a remodeling of the little frame house and the installation of an exhibit depicting the history of the Union Pacific.

Truck Loadings in May Reach Peak

The heaviest movement of revenue freight by motor trucks in any single month since January, 1937, when the American Trucking Associations began computing national truck-loading averages, was recorded during May, according to the monthly survey released by the Association on June 26. Truck loading figures for May showed an increase of 10.7 per cent over April of this year, and were 32.7 per cent above the figure for May a year ago, according to the A. T. A. survey.

Comparable reports were received from 212 carriers in 37 states showing total loadings of 1,072,301 tons during May as compared with 968,874 tons in April and 808,088 tons in May of last year. The May figures also represent an increase of 25.16 per cent over the 1936 monthly average of the 212 reporting carriers. Thus, the ATA truck loadings index figure for May, 1939, was 125.16 as against 114.19 in April, 1939, and 92.24 in May, 1938. In computing index figures, the 1936 monthly average is taken to represent 100 per cent.

General merchandise, accounting for a little over 75 per cent of the total tonnage reported for May showed an increase of 10.6 per cent over the previous month and a 32.2 per cent increase over May, 1938. Representing 11 per cent of the total, petroleum products increased 6.2 per cent over the previous month and 25.3 per cent over the corresponding month last year.

Due largely to the Briggs strike, says the A. T. A. report, transportation of automobiles in May declined 4.1 per cent compared with April, 1939, but rose 56.0

per cent over May of last year. Movement of iron and steel showed increases of 14.4 per cent over April and 34.1 per cent over the corresponding month in 1938. Traffic falling within this classification, however, continued 43.1 per cent below the 1936 monthly average.

New D. L. & W. Lounge-Buffer Car Fitted with Novel Photographs

The Delaware, Lackawanna & Western has turned out a buffet-lounge car in its Kingsland (N. J.) shops, the interior decoration of which utilizes, for the first time in railroading, color photography on stainless steel by chemical-light action has been developed by Permanent Arts, Inc., New York, and the Electro-Metallurgical Company, a subsidiary of United States Steel Corporation. For the Lackawanna car six photographs of early locomotives of the road ("Spitfire," "Essex," "Speedwell," "No. 16," "John R. Blair," and the "A. Lincoln") have been so reproduced and the steel plates imbedded in plate glass mirrors, left partially unsilvered to permit the photographs to be viewed. These mirrors appear in panels at the ends of the buffet-lounge section.

The interior color scheme of car No. 788 is copper and olive-green with aluminum and stainless steel trim while the exterior is in the standard solid green of the Lackawanna. The lounge and buffet sections are separated by turrets and light columns, the latter being pilasters of rods of a plastic known as "Lucite" which "bends" light rays cast upon it. On the turrets are mounted large plant holders also decorated with Lucite rods and aluminum. The buffet section seats 18 persons in semi-circular booths, the seats of which face the windows across the table. Fabrics of the furniture are in shades of olive green, faun henna and plum.

The car is fully air-conditioned by a safety-carrier ice-activated system with evaporator unit and Pyle-National multi-vent outlets. The kitchen is air-conditioned partly by a branch outlet and partly

by exhaust air from the main part of the car. Interior illumination of the car, of 10-foot-candle intensity, consists of a sky-light type center row of 90 15-watt lamps with a white plastic cover; safety, double-prismatic direct reading lights over each seat with 25-watt lamps and four small table lamps.

The car is a rebuilt standard steel parlor car and was designed by Douglas Ernst of Contract Service, Inc., New York.

Hearings Continue on Rail Court Measure

Hearings on the Senate-approved railroad reorganization court bill, S. 1869, were resumed before the House judiciary committee on June 28. At the beginning of the hearing, Chairman Chandler, Democrat of Tennessee, announced that he had written to every federal district judge who had a railroad reorganization case on his docket asking his views on the pending bill. He went on to say that as the letters were received, he would place them in the record.

The first witness was John W. Stedman, vice president of the Prudential Insurance Company of Newark, N. J. and the chairman of the Stedman bondholders' committee in the Missouri Pacific reorganization case. He opposed the enactment of the measure, saying that he believed the bill would unnecessarily impoverish railroad investors and will eventually bring about government ownership.

Turning to the subject of the reorganization court, Mr. Stedman told the committee that he did not believe a court of five judges would be able to handle the vast amount of work which would come before it. He also felt that the work of the district judges in the pending reorganization cases was "on the whole, very creditable."

Asked what he would do to solve the railroad problem, Mr. Stedman said that he favored consolidations, coordination, abandonments, taxation equalization for the carriers and laws which would force producers, wholesalers and manufacturers to give up the use of their own vehicles for

the transportation of their products. He also thought that before there was much railroad recovery, there would have to be a new labor policy in the industry.

Asked by Chairman Chandler as to whether or not the investors would prefer to wait a while longer before the bankrupt roads are reorganized or accept amendments to section 77, Mr. Stedman said they preferred to wait rather than take such a bill as is now before the committee.

Other witnesses were Frederick W. Walker, vice president of the Northwestern Mutual Life Insurance Company, and C. A. Miller, general counsel for the American Short Line Railroad Association, both of whom opposed the reorganization court feature of the bill and the 12-year yardstick provision which would limit the fixed charges of the reorganized company to not more than the average earnings during the past 12 years.

New M. & St. L. Plan Heard by I. C. C.

Hearings on the new plan for the reorganization of the Minneapolis and St. Louis were begun before the Interstate Commerce Commission at Minneapolis, Minn. on June 26. At the opening of the hearing, a slight modification of the plan for reorganizing the system into two companies was announced by C. W. Wright, counsel for the reorganization committee. The plan, suggested following the commission's disapproval of the proposal that Associated Railways take over the M. & St. L., called for one company designated as company A to operate the heavier traffic line from Minneapolis to Peoria, Ill., and Des Moines, Iowa, and company B to own all lines west of Winthrop, Minn. The major concern would own the trackage between Minneapolis and Winthrop, Hopkins and Peoria and Albert Lea and Des Moines. The second company, to be owned by the first, would get the trackage west of Winthrop to Conde, S. D., thence westward to Akaska, and northward to Aberdeen and Leola. Capitalization would be scaled down from 60 to 10 million dollars and only first mortgage bonds would be interest bearing. These would go to the RFC, which proposes to loan one section of the system \$5,000,000 to pay off preferred creditors and rehabilitate the property. The modification would throw into company B the 61 miles of line between Hopkins and Winthrop, giving this company trackage directly into Minneapolis.

The plan is being opposed by towns, business firms, civic organizations, railway brotherhoods and state governments, practically the same group that opposed the dismemberment plan three years ago. Opposition to the plan is largely for two reasons;—fear that the B company, forced to stand on its own, would eventually be abandoned, and the possibility of removal of the Minneapolis shops, employing more than 300 persons, to Marshalltown, Iowa.

The first witness called by the petitioner at the hearing that is being conducted by C. E. Boles, assistant finance director of the I. C. C., was W. W. Colpitts, chairman of the reorganization committee. He testified that in his opinion the present



Buffet Seats in the Lackawanna's New Buffet-Lounge Car No. 788 Face the Window

management of the road which has been highly successful in operating the road during the recent years, will leave if the reorganization plan fails. The proposed contract under which the A company would operate the B company has a 90-day cancellation clause, and this clause has stimulated the fear that the B company eventually would be abandoned on short notice. Mr. Colpitts explained, however, that this 90-day cancellation was put into the contract to make it possible to make desirable changes in the relations between the two companies as they develop, and without the delay which would be necessary if this contract had a longer cancellation clause. Mr. Colpitts, when asked if \$3,000,000 of a contemplated RFC loan earmarked for line improvements of company A was an excessive expenditure, replied that much more could be spent and that there is no reason to believe that with proper improvement the railroad could not be brought to the point of competing with other railroads.

L. C. Sprague, president and receiver of the road, said that the management has withdrawn the application that it filed with the I. C. C. in May for authority to abandon the lines from Aberdeen to Akaska and from Conde to Leola. Previously, the receiver had proposed to abandon also the Watertown-Aberdeen line, making a total of 217 miles that would be dismantled. At present, the company is considering the abandonment of only 137 miles.

C. W. Wright, general counsel of the road, and G. A. Anderson, comptroller, were of the opinion that if present conditions in traffic and earnings, both of which have improved greatly in the 4½ years since the present management took charge, are maintained, the road could work itself out of the receivership in fifteen or sixteen years. That would mean the payment of claims such as \$3,492,682 of preferred claims and interest; \$162,025 of receivers' certificates outstanding; \$743,654 of equipment trust certificates; and \$950,000 of principal and \$400,000 of interest on the Albert Lea-Merriam Junction first mortgage bonds. Ending the receivership by this gradual process, however, they said, would leave stock and bondholders no better off than now. All mortgages against the M. & St. L. properties, outstanding as security bonds but in arrears, total \$44,286,095, while the face value of stock is \$25,792,600. Accumulated interest on the bonds totals \$38,473,380.

Mr. Anderson testified that the book value of all stocks and bonds, represented capital invested in the road, is \$65,109,866. From July 26, 1923, when the present receivership began, to December 31, 1938, its gross revenues amounted to \$176,328,484. Of this, \$98,321,032 was paid out in salaries and wages, exclusive of expenses incidental to the receivership. Since 1936 the road has paid over \$1,000,000 of receivers certificates and \$1,054,933 of equipment trusts, but has been able to pay only \$952,258 of mortgage interest.

I. C. C. Acquiesces in Parcel Post Rate Reduction

The Post Office Department will shortly put into effect sizable reductions in rates

on certain fourth-class or parcel post matter following approval on June 24 of the proposed rates by the Interstate Commerce Commission. In the application filed by the Postmaster General on May 16, the Post Office Department proposed to reduce the rates of postage on individually-addressed catalogs and similar printed advertising matter in bound form, consisting of 24 or more pages and not exceeding 10 lbs. in weight.

The new rates are designed to restore the forwarding of catalogs and similar printed matter to the mails, to prevent further diversion of such material, and to attract new business.

Since the present rates were established, it was testified at the hearings, millions of mail order catalogs have been withdrawn from the mails and distributed by other means. The testimony showed that they are now shipped principally in freight service by railroads or by motor vehicle to various centers, and thence delivered in private automobiles, on bicycles and on foot. According to an estimate of the Post Office Department, based upon correspondence with postmasters and information obtained from catalog distributors, more than 12,000,000 catalogs, weighing in the aggregate 45,000,000 lbs., are now being distributed annually in this manner.

The Postmaster General estimates that more than \$600,000 additional revenue will be derived from the new business. Commissioner Eastman dissented from the majority's findings, saying that "Here we have evidence that the present rates do tend to discourage the movement of the traffic in question, but there is an entire lack of evidence that the receipts therefrom, if the rates are reduced sufficiently to encourage movement, will not be less than the cost of the service. In the absence of such evidence, I am of the opinion that we should not give our consent." Commissioner Rogers joined in Mr. Eastman's dissent.

Buses Continue to Gain Faster Than Railroads

Class I motor carriers of passengers reported March revenues of \$7,659,598 as compared with \$7,052,867 for March, 1938, an increase of 8.6 per cent, according to the monthly compilation prepared by the Interstate Commerce Commission's Bureau

the railroads were less than 1 per cent greater in March this year than in March last year and railroad passengers carried in March this year were 12 per cent fewer than in March last year. Bus lines, as the appended table discloses, made their most marked revenue gains in those regions where railroad fares are the highest. The breakdown of the bus traffic and revenue figures by regions is given in the accompanying table.

Portugal Contemplates American Rail Purchases

Railway companies of Portugal are contemplating the purchase of approximately \$5,000,000 of new rolling stock to replace the very old equipment now in use, according to a report from the American consulate at Lisbon to the Department of Commerce. These purchases will probably be for delivery by May, 1940, the date set for the opening of the centennial celebration in Portugal.

Jesse Jones, chairman of the Reconstruction Finance Corporation announced at a press conference on June 26, that the Export-Import Bank recently made a commitment to finance such a purchase by Portugal up to an amount of \$5,000,000.

The probability that orders will be placed for American equipment is good, since representatives of the Portuguese railways have visited the United States on an inspection trip arranged for them by the Department of Commerce. A representative of American manufacturers of railway equipment who has since visited Portugal in connection with the contemplated purchases, said that the local railways are giving much consideration to placing the orders in the United States, according to the Commerce Department report.

No More Butter for the Biltmore?

(Continued from page 44)

the troubles of the railroads. Aside from these more general questions, however, except in one respect the bill S. 2610 does not establish any new forms or mechanisms of regulation. Since the time of the original Interstate Commerce Act the com-

	Passenger Revenue		% Inc. or Dec.	Passengers Carried	
	March, 1939	March, 1938		March, 1939	March, 1938
New England Region	\$382,048	\$328,140	+13	1,032,652	890,758
Middle Atlantic Region	1,173,244	974,638	+20	2,618,752	2,380,281
Central Region	1,306,209	1,058,574	+23	1,615,551	1,474,337
Southern Region	1,706,928	1,716,034	-1	2,070,290	1,898,567
Northwestern Region	284,648	269,484	+5	277,634	264,053
Mid-Western Region	696,268	698,322	...	590,611	575,350
Southwestern Region	983,678	975,881	+1	1,058,619	1,025,608
Rocky Mountain Region	88,373	85,964	+3	76,218	78,750
Pacific Region	984,202	945,830	+4	1,117,349	967,261

of Statistics and Bureau of Motor Carriers from 146 reports representing 147 bus operators.

Passengers carried increased 11 per cent, from 9,554,965 to 10,457,676. By contrast, non-commutation passenger revenues of

mission has been charged with the duty of keeping itself adequately informed of the condition and activities of the carriers, by requiring reports, examining their accounts and records, and by other means.

"This is, indeed, one of the historical

functions of the commission, and is the foundation upon which informed and intelligent administration of the Act rests. Similarly, since 1920 the commission has been charged with the duty of supervising the security issues of railroads, and probably few people today would contest the wisdom of this measure of regulation. In extending the above provisions to subsidiaries of carriers, the scope of the law would merely be brought in conformity with modern conditions."

"In giving the commission supervision of expenditures by railroads for purposes unconnected with their regular business," the commissioner added, "it is true that a new type of regulation would be established. These provisions are by no means radical in theory nor will they involve any new restrictions on regular carrier operations. Only where the railroads seek to go outside their normal sphere of activity, and engage in what might be called 'outside adventures' will these provisions come into play. The record of the railroads in carrying on these adventures is, on the whole, very unsuccessful and, as has been pointed out, serious losses to the investing public have resulted."

Mr. Mahaffie explained to the committee that it was a debatable question as to whether or not the commission had the power at the present time to go into the outside affairs of railroad companies and that the commission felt that such a bill should be enacted to make that power clear. He blamed intense competition between companies for the abuses of power, which he alleged, had been used in the past and still continue.

The Interstate Commerce Commissioner did not think that the bill can properly be called a "strait-jacket" measure because, he said, it does not interfere with "Legitimate managerial rights." Rather, he believes that the measure will force the carriers to confine their activities to purely transportation activities as contrasted with investments in other railroads or holding companies or subsidiaries.

R. V. Fletcher, vice president and general counsel for the Association of American Railroads, briefly informed the committee that his group would oppose the measure. His attitude on the bill was revealed when he jokingly told Mr. Mahaffie that the question which was troubling him was how the Biltmore Hotel in New York City (located on land owned by the New York Central) was going to be able to buy a pound of butter without having to first obtain authority from the commission to do so.

The witness at the June 27 session of the committee was Telford Taylor, assistant general counsel for the Wheeler rail finance investigating committee, who testified in detail regarding those aspects of the bill which he had become acquainted with during the four years that he has been with the committee.

At the outset of the hearing Judge Fletcher asked that the committee consider a request presented by the railroads that they be not called upon to present evidence on the bill at this session of Congress. Judge Fletcher went on to explain that a committee of the A. A. R. is now making

a study of outside railroad investments and will not be in shape to report until the next session of Congress. He hoped the committee would not press the bill this session. Earlier, Senator Truman had said that the bill will be pushed with the hope of enactment at the present session.

At the conclusion of the hearing Senator Truman announced that the committee hoped that the railroads would be in a position to give testimony on the bill when hearings were resumed on July 10. He added that both Senator Wheeler and he were anxious to present the measure to the Senate at this session for consideration.

Retirement Board Probes Annuities

(Continued from page 44)

be decreased somewhat if it were possible to exclude from this group those retiring within the calendar month of their 65th birthday and therefore not subject to reduction. In addition, it is pointed out, some of these annuities may, on recertification, be transferred to the group "disability with 30 years of service" when disability is proved or in a few cases to "age above 65" if age is proved.

One of the chief reasons, the report continues, for the higher proportion of disability annuities in the current fiscal year as compared with the total preceding period is the fact that the amendatory Railroad Retirement Act of 1937 permits an employee with less than 30 years of service to retire if he is at least 60 years of age, whereas the 1935 Act limited disability annuities to employees with 30 years of service. The 1937 Act, moreover, extends the definition of employment relation to cover persons absent from work on August 29, 1935, on account of disability.

The report also points out that the lower percentage of disability annuities in the earlier period of operation is due in part to the greater accumulation of persons eligible for age annuities than for disability annuities when the retirement system was first set up. Not only, it continues, were there a great many workers in active service who had continued to work long after the age of 65, but disabled workers who had reached the age of 65 became eligible for age and not for disability annuities.

Another important factor, the report concludes, which explains the low rate of certification of disability annuities in the earlier period of the Board's operations was the fact that the lag in the certification of such annuities was greater than in the case of age annuities. This, it is explained, was partly due to the relatively large proportion of disability cases involving the determination of the existence of an employment relation on August 29, 1935. In part, also, it was due to the difficulty of determining the existence of disability within the meaning of the 1937 Act.

The weekly review also reports that preliminary results of a study made by the Bureau of Research and Information Service show that 244,481 employees or

12.5 per cent of the total of 1,957,688 employees with credited compensation under the Railroad Retirement Act in 1937, also earned wages that year in industries other than the railroad industry.

A smaller proportion of Class I railroad employees had earnings in employments outside the industry than employees of other classes of railroad employers, the report shows. The proportion of 1937 employees with earnings in other industries is 11.2 for Class I railroads, compared with 23.7 per cent for electric railroads, 22.8 per cent for express and car-loan companies, 22.2 per cent for Class II and III railroads, 19 per cent for switching and terminal companies, and 13.3 per cent for the Pullman Company.

British Society Honors Loewy

Raymond Loewy, New York industrial designer, whose American clients include the American Car & Foundry Co., and the Pennsylvania, was recently honored by the Royal Society of Arts of Great Britain, which conferred upon him the honor of "Royal Designer to Industry." Founded in 1754, the society has for the first time in its history departed from precedent and thus dignified a non-British subject.

R. R. Y. M. C. A. National Assembly

One outcome of the Triennial International Transportation Conference of the Y. M. C. A., which was held at Toronto, Canada, last November, was the appointment of a number of commissions to study and promote activities along various strategic lines during the next three years.

All-day meetings of these commissions were held at Washington, D. C., June 21. On the two following days the reports and findings of the commissions were considered by the National Railroad Assembly, made up of representatives, lay and secretarial, of the Railroad Y. M. C. A.'s of North America. The three sessions of the Assembly on Thursday, June 22—morning, afternoon and evening—were utilized for the consideration and discussion of the reports of the Commission on Membership, John G. Walber, vice-president, personnel, New York Central System, chairman; the Program Advance and Religious Work Commissions, A. O. Herman, assistant to general manager, Baltimore & Ohio, chairman; the Personnel Commission, H. A. Enoch, chief of personnel, Pennsylvania Railroad, chairman; and the Commission on Responsible Citizenship, Roy V. Wright, managing editor, *Railway Age*, chairman. Senator Clyde M. Reed, of Kansas, participated in the discussion of this latter report. The closing session on Friday, June 23, was devoted to the report and discussions of the findings of the Commission on Organization, Administration and Relationships, J. B. Parrish, assistant vice-president, Chesapeake & Ohio, chairman.

The Assembly was characterized by a large and representative attendance. A discussion of the commission reports and findings prior to the summer season makes it possible for the different associations to plan more intelligently for their work next season.

Supply Trade

The Hasler-Tel Company, on July 1, will move its office from 461 Eighth avenue to 30 Vesey street, New York.

At a meeting of the board of directors of **The Baldwin Locomotive Works** on June 22, the board was increased by the election of **William H. Harman** and **William H. Winterrowd**, vice-presidents of the company in charge of sales and operations, respectively.

H. R. Condon, vice-president of **The Wood Preserving Corporation**, a **Koppers Company** subsidiary, has been transferred from the company's Philadelphia, Pa., office to the Pittsburgh general office. Mr. Condon formerly was in charge of the corporation's eastern division.

E. W. Seeger, in charge of the production engineering department of **Cutler-Hammer, Inc.**, Milwaukee, Wis., has been appointed manager of its development department and **P. B. Harwood**, assistant in charge of the production engineering department, has been appointed manager of the engineering department.

Edwin J. Mohr, manager of plant operations for **The Symington-Gould Corporation**, Rochester, N. Y., and the **Gould Coupler Corporation**, Depew, has retired on account of ill health after nearly 30 years service with The Symington-Gould Corporation and its subsidiary and predecessor companies. The former assistant managers of plant operations, **W. H. Hartwig** at Rochester and **D. P. Murphy** at Depew, have been appointed production managers for the two plants respectively.

American Manganese Expands Chicago Heights Plant

The American Manganese Steel Division of the American Brake Shoe & Foundry

Co., has expanded its main plant at Chicago Heights, Ill., with six additions and a new administration building. The administration building is 105 ft. by 94 ft. and two stories high, while the additions include an employees' welfare building, 82 ft. 8 in. by 55 ft.; a foundry, 120 ft. by 80 ft.; a pattern storage, 127 ft. by 152 ft.; a machine shop, 50 ft. by 80 ft.; a shipping room, 50 ft. by 200 ft.; and a heating plant, 50 ft. by 48 ft.

OBITUARY

Arthur H. Peterson, managing editor of the *Railway Engineering and Maintenance Cyclopedia* from July 1, 1938, until forced to relinquish this position by ill health in the fall of that year, died at his home in Spencer, Iowa, on June 26 after a lingering illness. Mr. Peterson was for several years roadmaster of the Chicago Terminal division of the Chicago, Milwaukee, St. Paul & Pacific. He was elected president of the Roadmasters and Maintenance of Way Association at its convention last September, relinquishing this position at the time of his retirement last October.

Equipment and Supplies

LOCOMOTIVES

THE FLORIDA EAST COAST has placed an order with the Electro-Motive Corporation for two Diesel-electric locomotives of 2000-hp. each, for operation on two new streamlined passenger trains.

THE KANSAS CITY SOUTHERN has ordered a 1000-hp. Diesel-electric switching locomotive from the Electro-Motive Corporation. The directors recently authorized

this purchase as was reported in the *Railway Age* of June 24, page 1103.

THE PHELPS DODGE CORPORATION has ordered one 600-hp. Diesel-electric locomotive from the Electro-Motive Corporation. This is in addition to four locomotives previously ordered from the same builder and reported in the *Railway Age* of April 15, page 678.

FREIGHT CARS

THE WESTERN MARYLAND has placed orders for 1,110 cars as follows: Pressed Steel Car Company, 500 box cars; Bethlehem Steel Company, 500 hopper cars; Greenville Steel Car Company, 100 gondola cars and 10 flat cars, all of 50 tons' capacity. Inquiry for this equipment was reported in the *Railway Age* of June 3, page 964.

PASSENGER CARS

THE FLORIDA EAST COAST, reported in the *Railway Age* of June 3, as planning to buy two new streamlined trains of seven cars each, to be hauled by Diesel-electric locomotives, has ordered 14 light-weight, stainless steel cars for these trains from the Edward G. Budd Manufacturing Company. These trains will consist of a combination baggage and chair car, four chair cars, one dining car and one observation lounge car; they will be placed in service about December 1, between Jacksonville, Fla., and Miami.

IRON AND STEEL

THE CHICAGO, BURLINGTON & QUINCY has ordered 8,000 tons of rails.

SIGNALING

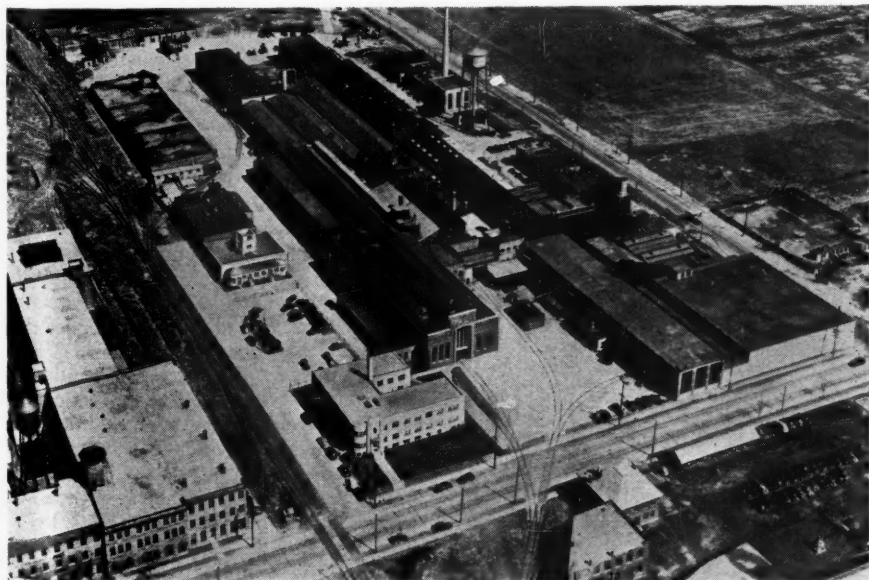
WASHINGTON.—The English Lumber Company, R. F. D. No. 5, Mt. Vernon, Wash., will receive sealed bids until 10:00 a. m., July 22, for miscellaneous signal material to be used in connection with federal grade crossing protection project south of Conway, Wash.

NORTH CAROLINA.—Sealed proposals will be received by the North Carolina State Highway and Public Works Commission in the office of William L. Craven, bridge engineer, Raleigh, N. C., until 10:00 a. m., July 18, for the installation of four flashing light signals on the Piedmont & Northern.

UNION PACIFIC.—Sealed proposals will be received at the office of E. L. Fries, general purchasing agent of this road, Omaha, Nebr., until 12 o'clock noon, (c. s. t.), July 12, for furnishing the materials for one railroad grade crossing protective device to be installed under federal grade crossing program in the State of Nebraska.

MOTOR VEHICLES

THE SOUTHERN KANSAS GREYHOUND LINES, INC., has received delivery of two 37-passenger buses from the a. c. f. Motors Company.



American Manganese Steel Division of The American Brake Shoe & Foundry Expands Its Plant at Chicago Heights, Ill., with Six Additions and a New Administration Building

Construction

AKRON, CANTON & YOUNGSTOWN.—The Ohio Department of Highways has awarded a contract amounting to \$206,121 to the C. B. Moon Company, Cleveland, Ohio, for the construction of a highway overpass over one track of the A. C. & Y. in Akron, Ohio. The bridge will consist of nine continuous steel beam spans of various lengths, totalling 529 ft. in length. It will have a concrete deck and substructure and will provide a 40-ft. clear roadway and a 5-ft. sidewalk on each side. The bridge will cross the track of the A. C. & Y. on a skew and will be built on a five-degree curve with superelevation. The estimated cost of the structure alone is \$143,883.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—A contract has been awarded the Dunnigan Construction Company, Minneapolis, Minn., for the construction of a new fruit and vegetable warehouse, with two tracks for unloading. The warehouse, which will cost approximately \$75,000, will be 450 ft. long and 65 ft. wide and will have a massive concrete foundation, a steel frame and combination hollow tile and brick walls. The roof will be of three-ply built-up asphalt on timber joists and deck, supported by steel bolstering roof trusses and will have numerous skylights. Automatic track and wagon doors will be installed.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—A contract amounting to about \$68,000 has been awarded the E. Bolander Construction Company, Libertyville, Ill., for the construction of a highway underpass under one track of the Milwaukee at that point. The bridge will consist of two 55-ft. skewed deck plate girder spans, crossing the highway at an angle of 35 deg., with reinforced concrete abutments and a pier supported on foundation piles. An I-beam-look floor, concrete filled, will support a ballast deck. The bridge will provide for two clear roadways 23 ft. wide and a 3-ft. side walk on each side. The contract, amounting to approximately \$16,000 for fabrication and delivery of the steel for this structure, was awarded to the A. F. Anderson Iron Works, Chicago.

GULF, COLORADO & SANTA FE.—The State Highway Department of Texas has awarded a contract amounting to \$72,573 to Cocke & Braden, Amarillo, Tex., for the construction of an overpass for U. S. highway No. 28 over a track of the G. C. & S. F. at the north city limits of Stephenville, Tex. The bridge, which will cost \$45,050, will consist of four 50-ft. and three 55-ft. I-beam spans, providing a clear roadway of 26 ft.

PENNSYLVANIA.—The Ohio Department of Highways has awarded a contract amounting to \$149,675 to the Contractors Finance Corporation, Cincinnati, Ohio, for the reconstruction of an existing underpass for U. S. Highway No. 50 near Milford, Ohio. The new bridge will consist of a 41-ft. 6-in. steel plate girder span on a concrete substructure, providing a 40-ft. clear roadway and two six-ft. side walks.

Financial

ATLANTIC & EAST CAROLINA.—*Lease and Issuance of Stock.*—This company has asked the Interstate Commerce Commission for authority to lease and operate the entire line of the Atlantic & North Carolina extending from Goldsboro, N. C., to Morehead City, 94 miles. The company also requests authority to issue \$110,000 of capital stock to carry out the transaction.

CENTRAL OF NEW JERSEY.—*Interest Deferment Plan.*—Hearings on this company's recently-announced interest deferment plan have been set by the Interstate Commerce Commission for August 1, in Washington, D. C., before Examiner A. C. Devoe.

CHICAGO & NORTH WESTERN-CHICAGO & EASTERN ILLINOIS.—*Appointment of Trustee.*—Charles M. Thomson, trustee of the Chicago & Eastern Illinois, told the Interstate Commerce Commission on June 22 during a hearing on the ratification of his appointment as trustee of the Chicago & North Western, that if he is ratified by the commission, he, in all probability, will name C. T. O'Neal and R. L. Williams, president and vice president, respectively of the C. & E. I., as chief operating officers of the C. & N. W.

Mr. Thomson told the commission, however, that if the transfer of these two men to the North Western would jeopardize the success of the C. & E. I. reorganization plan, other arrangements would probably have to be made. Mr. Thomson was loud in his praise of Mr. O'Neal and Mr. Williams, saying that the recent improvement in the earnings of the C. & E. I. was due, in a large measure, to their efforts.

No opposition to Mr. Thomson's appointment as trustee of the C. & N. W. developed at the hearing. Attorneys for the insurance companies and savings banks and the Reconstruction Finance Corporation told the commission that they had no objection to Mr. Thomson's appointment, but emphasized the fact that any appointments of Mr. Thomson would have to be his own personal responsibility.

CHICAGO GREAT WESTERN.—*Principal and Interest Payment.*—The federal district court at Chicago on June 21 authorized the trustees of the Chicago Great Western to pay maturing principal and interest on outstanding equipment trust obligations due prior to July 1, 1940. Payments to be made include \$60,000 principal and \$11,600 in interest due July 1, 1939, on equipment trust obligations series B, and \$149,000 principal, together with \$23,467 in interest, due October 1, 1939, on series A obligations.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Abandonment.*—This company has asked the Interstate Commerce Commission for authority to abandon a line extending from Mazomanie, Wisc., to Prairie du Sac, one mile.

COLORADO & SOUTHERN.—*Lease and Assumption of Liability.*—This company has asked the Interstate Commerce Com-

mission for authority to lease the properties owned and/or operated by the Fort Worth & Denver City and the Wichita Valley and for authority to assume liability and payment of the principal and interest of a note of \$8,176,000 of the Fort Worth & Denver City now held by the Reconstruction Finance Corporation.

GREAT WESTERN.—*Abandonment.*—This company has been authorized by Division 4 of the Interstate Commerce Commission to abandon a branch line extending from Maloy, Colo., to Duke, 1.7 miles.

MINNEAPOLIS EASTERN.—*Bonds.*—This company has asked the Interstate Commerce Commission for authority to extend for a period of 10 years from January 1, 1939, and to assume liability for, \$150,000 of its refunding mortgage bonds.

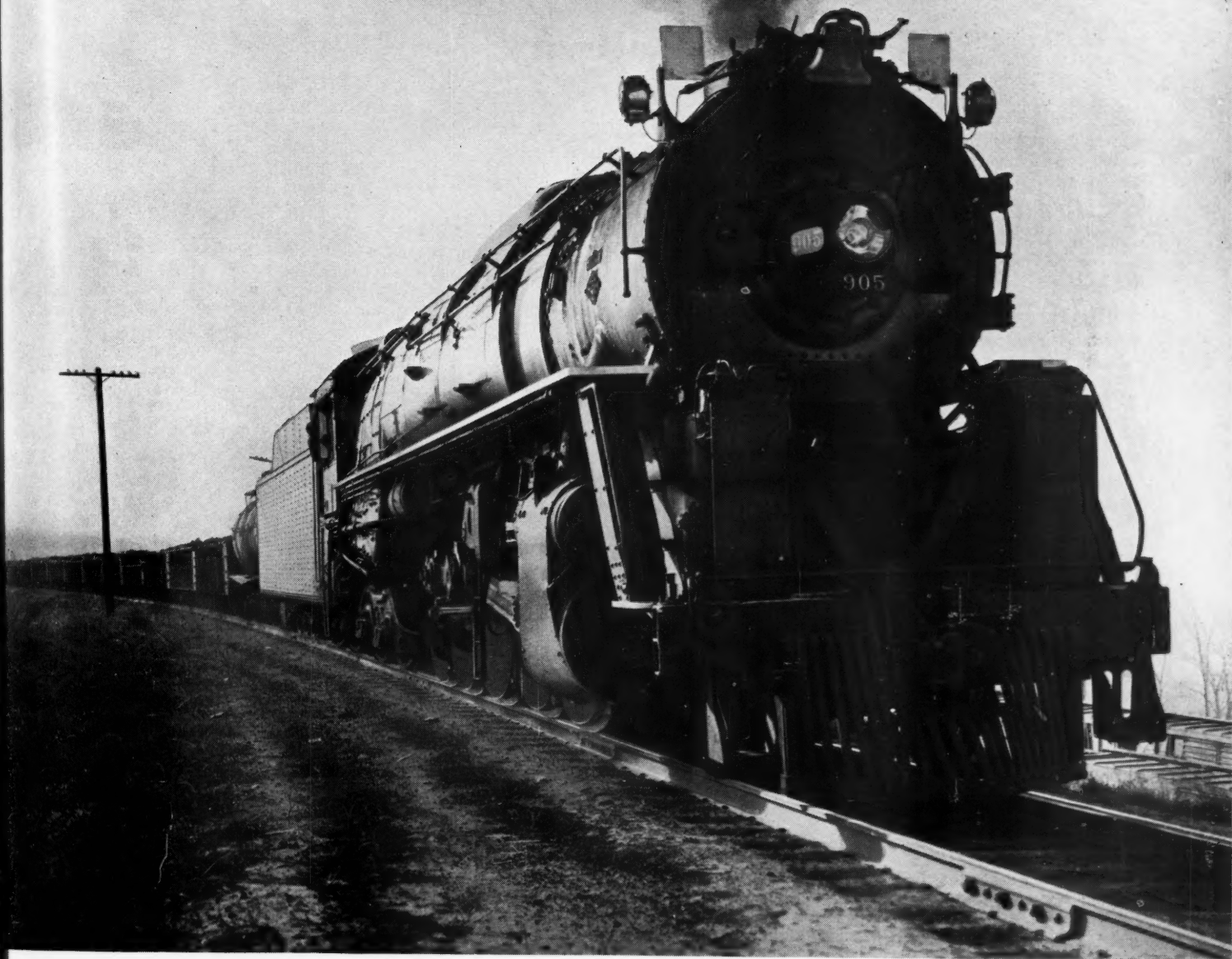
MINNEAPOLIS, NORTHFIELD & SOUTHERN.—*Bonds.*—This company has been authorized by Division 4 of the Interstate Commerce Commission to extend from September 1, 1939, to September 1, 1944, the date of maturity of \$242,800 of five year convertible six per cent gold notes.

SOUTHERN.—*Stock of the Cincinnati, New Orleans & Texas Pacific.*—Division 4 of the Interstate Commerce Commission has authorized the Cincinnati, New Orleans & Texas Pacific to issue \$8,970,000 of common capital stock consisting of 448,500 shares of a par value of \$20 each, in exchange for outstanding common stock consisting of 89,700 shares of the par value of \$100 each, on the basis of five shares of new stock for one share of the old.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—*Refinancing.*—The Terminal Railroad Association of St. Louis first mortgage 4½ per cent bonds which mature on October 1, will be refinanced by a new issue of bonds bearing interest at not more than 3½ per cent, with a sinking fund provision calling for payment of about 1½ per cent per year to pay off the bonds at or prior to maturity in 1974. Under the plan, the fifteen proprietary companies will each be responsible for ⅓ of the annual charges, excepting the Missouri Pacific, which has a ⅓ interest. The plan was approved by the directors of the Terminal Association at a meeting on June 12, while the stockholders, the fifteen railroads, met on June 26 to ratify the plan. The federal district court at St. Louis on June 23 granted trustees of the Cotton Belt authority to join in the refinancing plan. The trustees or receivers of the Missouri Pacific, the St. Louis-San Francisco, the Wabash, the Chicago, Rock Island & Pacific and the Chicago & Eastern Illinois are expected to present similar petitions to the court. Other roads comprising the Terminal Association are the Pennsylvania; the New York Central; the Missouri-Kansas-Texas; the Baltimore & Ohio; the Illinois Central; the Alton; the Chicago, Burlington & Quincy; the Southern and the Louisville & Nashville.

Robert R. Young, chairman of the Alleghany Corporation has sent a letter to representatives of the railroads which con-

LIMA POWER AT WORK



This heavy 2-10-4 type locomotive was recently delivered by Lima to the Kansas City Southern

MODERN POWER is fast and economical

Modern Lima-built power is proving the money-making abilities of new locomotives. Heavier train loads hauled at higher speeds result in greater net earnings. But only modern steam locomotives have the required horsepower capacity to haul increased loads *faster and more economically.*

LIMA LOCOMOTIVE WORKS



INCORPORATED, LIMA, OHIO

trol the Terminal Railroad Association, urging that the proposed \$7,000,000 bond issue of the company be thrown open to competitive bidding. Declaring that Alleghany Corporation "is indirectly but keenly interested in the Terminal Railroad Association of St. Louis through its direct holdings of Missouri Pacific securities and its indirect holdings of Chicago & Eastern Illinois," Mr. Young urged that an invitation be issued for sealed bids "in order that every incentive be furnished prospective bidders."

WABASH.—Bonds.—Division 4 of the Interstate Commerce Commission has ordered that its order of March 22, 1939 be modified so as to limit to \$2,235,000 the amount of first mortgage four per cent serial bonds of the Wabash-St. Charles Bridge Company in respect of the payment of interest and principal of which the Wabash may assume liability as guarantors and lessees. The commission had originally authorized the company to guarantee the principal and interest on \$2,350,000 of the bonds, but it was found that it was necessary to issue only \$2,235,000.

WESTERN MARYLAND.—Equipment Trust Certificates.—This company has asked the Interstate Commerce Commission for authority to assume liability as guarantor for \$2,300,000 of two per cent equipment trust certificates, maturing in 10 equal annual installments of \$230,000 each on August 1, in each of the years from 1940 to 1949.

Harriman Ripley & Co., New York, has been awarded the issue at the high bid of 101.5311.

WHEELING & LAKE ERIE.—Bonds.—Division 4 of the Interstate Commerce Commission has authorized this company to issue \$2,188,000 of refunding mortgage serial 2½ per cent bonds, series E, and \$5,250,000 of refunding mortgage 3½ per cent bonds, series F, to be sold at par and accrued interest, and the proceeds used to redeem \$7,438,000 of refunding mortgage bonds, series D. The series E bonds will mature in semiannual installments on December 15, and June 15, in each of the years from December 15, 1939, to June 15, 1949, while the series F bonds will mature June 15, 1966. The series E bonds have been sold to the Union Trust Company of Pittsburgh and the series F bonds have been sold to the Mellon Securities Corporation of the same city at par and accrued interest.

Average Prices of Stocks and Bonds

	Last June 27	Last week	Last year
Average price of 20 representative railway stocks...	28.34	28.62	25.19
Average price of 20 representative railways bonds...	58.82	59.07	56.33

Dividends Declared

Carolina, Clinchfield & Ohio.—\$1.25, quarterly, payable July 20 to holders of record July 10.

Philadelphia & Trenton.—\$2.50, quarterly, payable July 10 to holders of record July 1.

Pittsburgh, Cincinnati, Chicago & St. Louis.—\$2.50, semi-annually, payable July 20 to holders of record July 10.

Richmond, Fredericksburg & Potomac.—Voting common, \$1.00, semi-annually; Non-voting common, \$1.00, semi-annually; Dividend obligations, \$1.00, semi-annually, all payable June 30 to holders of record June 23.

Railway Officers

EXECUTIVE

C. S. Christofer, general superintendent and purchasing agent of the St. Paul Union Depot Company and president of the Minnesota Transfer Railway, with headquarters at St. Paul, Minn., has been elected vice-president and general manager of both companies, with the same headquarters.

L. A. Thomas, superintendent of police of the Southern, with headquarters at Washington, D. C., has been appointed assistant to vice-president, investigation and police, effective July 1. He will have charge of the police department and will conduct such investigations as are assigned to him. The position of superintendent of police has been abolished.

FINANCIAL, LEGAL AND ACCOUNTING

George T. Savage, advertising agent of the Illinois Central, with headquarters at Chicago, has been promoted to manager of advertising service, with the same headquarters, a newly created position.

OPERATING

R. G. May has been appointed trainmaster of the St. Lawrence, Ottawa and Adirondack divisions of the New York Central, with headquarters at Watertown, N. Y.

J. D. Walker, assistant general manager of the Colorado & Southern, has been promoted to general manager, with headquarters as before at Denver, Colo., succeeding to a portion of the duties of **Robert Rice**, vice-president and general manager, who has been elected vice-president with headquarters as before at Denver.

W. J. Hotrum has been appointed superintendent of terminals, Canadian National, with headquarters at Black Rock, N. Y., succeeding **N. A. Walford**, who has been appointed superintendent of the Stratford division, with headquarters at Stratford, Ont., succeeding **R. E. Orr**, who has retired on pension.

E. J. Stubbs, superintendent of car service of the Erie, with headquarters at Cleveland, Ohio, has been assigned jurisdiction over the car service department, succeeding to the duties of **J. J. Moynihan**, superintendent of car service, who retired on July 1. The position of superintendent of car service has been abolished.

Laurence Wylie, trainmaster on the Trans-Missouri division of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Miles City, Mont., has been promoted to assistant superintendent on the Coast division, with headquarters at Tacoma, Wash., succeeding **T. J. Hamilton**, who has retired. **C. A. Nummerdor**,

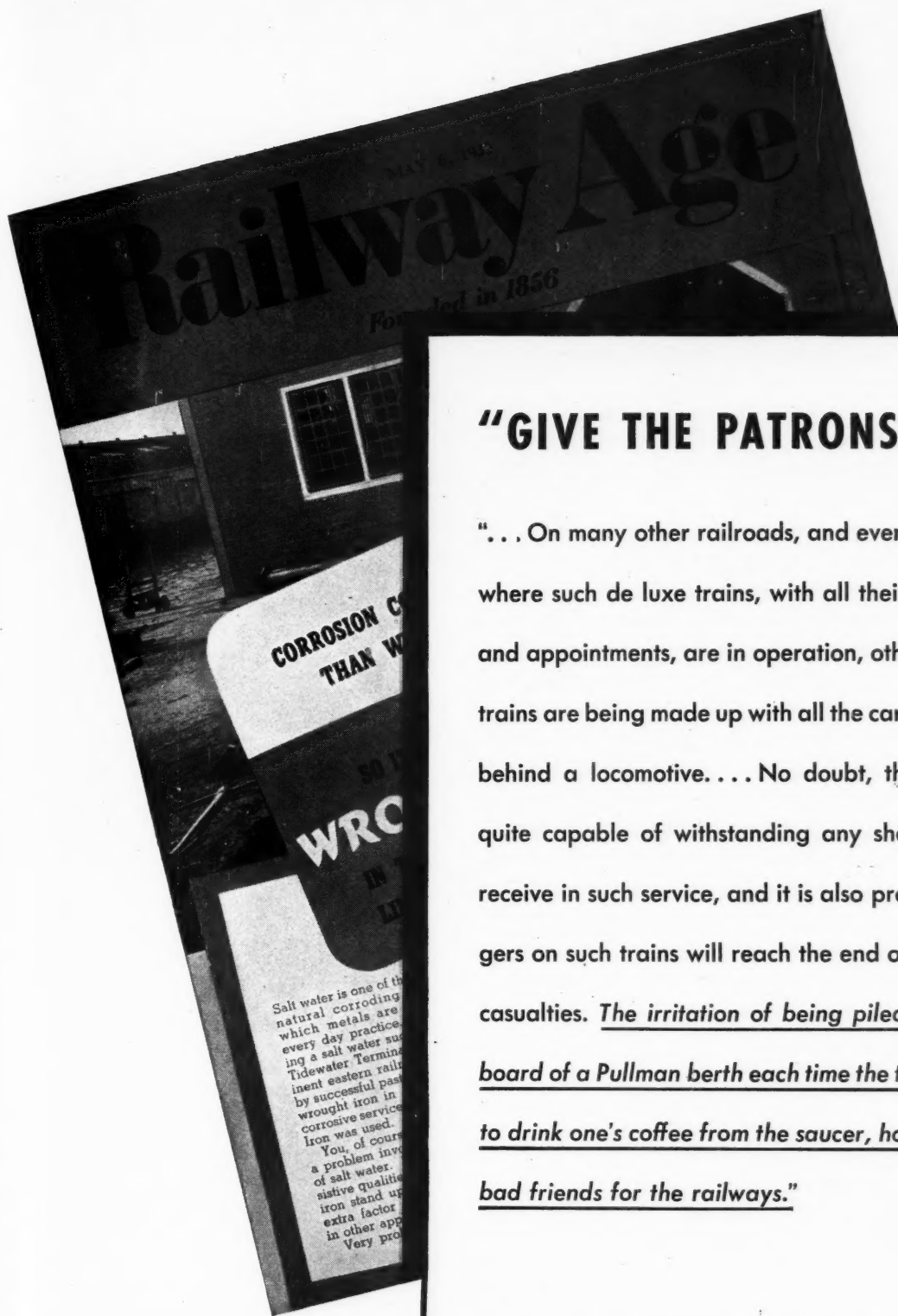
chief dispatcher, has been promoted to trainmaster at Miles City, replacing Mr. Wylie.

D. A. Fawcett, assistant to the assistant general manager of the Cleveland, Cincinnati, Chicago & St. Louis (Big Four) with headquarters at Indianapolis, Ind., has been promoted to assistant superintendent of the Ohio division, with headquarters at Springfield, Ohio, succeeding **Earl B. Padgett**, who died on May 1. **C. F. Wiegeler** trainmaster of the Indiana division at Cincinnati, Ohio, has been advanced to assistant to the assistant general manager at Indianapolis, relieving Mr. Fawcett and **K. F. Emmanuel**, trainmaster of the Illinois division at Mt. Carmel, Ill., has been transferred to Cincinnati, replacing Mr. Wiegeler. **A. M. Smith**, chief dispatcher of the Ohio division at Springfield, has been promoted to trainmaster at Mt. Carmel succeeding Mr. Emmanuel.

J. J. Moynihan, superintendent of car service of the Erie, with headquarters at Cleveland, Ohio, has retired after 48 years of service. **E. J. Stubbs**, superintendent of transportation, has assumed jurisdiction over the car service department. The position of superintendent of car service has been abolished. **Stanley F. McGranahan** has been appointed assistant superintendent of transportation. **J. W. Graves**, assistant general manager of the Eastern district, with headquarters at Jersey City, N. J., has been transferred in the same capacity to the Western district, with headquarters at Youngstown, Ohio, succeeding **R. C. Randall**, who has been transferred to Jersey City, as assistant general manager. **Paul J. Kindler** has been appointed assistant supervisor of Wage Bureau. **Donald A. Logan** has been appointed inspector of operation, succeeding **G. C. White**, promoted.

John O'Dwyer Healy, whose promotion to superintendent of the Prince Albert division of the Canadian National, with headquarters at Prince Albert, Sask., was announced in the *Railway Age* of June 17, was born on January 25, 1888, and entered railway service on February 28, 1908, as a yard clerk on the Canadian Northern (now part of the Canadian National System). In August, 1908, he was transferred to Saskatoon, Sask. In October, 1909, he became a telegraph operator and served in various agencies in the Saskatchewan and Alberta districts until 1918, when he was promoted to terminal agent and yardmaster at North Battleford, Sask. Mr. Healy was advanced to trainmaster at Drumeller, Alta., in August, 1922, and a year later he was promoted to assistant superintendent at Hanna, Alta. He was later transferred to various points on the Alberta and Saskatchewan districts and on January 1, 1937, he was promoted to special representative of the vice-president, with headquarters at Winnipeg, Man., the position he held at the time of his recent promotion.

E. E. McCarty, assistant to vice president of Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been promoted to general manager with head-

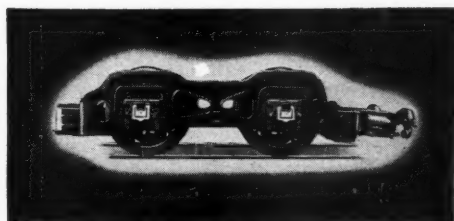


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"... On many other railroads, and even on the same railroads where such de luxe trains, with all their refinements of design and appointments, are in operation, other main-line passenger trains are being made up with all the cars which can be handled behind a locomotive. . . . No doubt, the cars themselves are quite capable of withstanding any shocks they are likely to receive in such service, and it is also probable that the passengers on such trains will reach the end of their journeys without casualties. The irritation of being piled up against the head-board of a Pullman berth each time the train starts, or of having to drink one's coffee from the saucer, however, is making many bad friends for the railways."

Reprinted from Railway Age

May 6, 1939



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FRANKLIN RAILWAY SUPPLY COMPANY, INC.

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July 1, 1939

quarters at Los Angeles, Calif., to succeed **J. R. Hitchcock**, retired, and has been succeeded by **G. C. Jefferis**, assistant general manager at La Junta, Colo., who in turn has been succeeded by **J. R. Skillen**, superintendent at Las Vegas, N. M. Mr. Skillen has been succeeded by **D. T. Trahey**, superintendent at Wellington, Kan., while **F. A. Baker**, trainmaster at Las Vegas succeeds Mr. Trahey, **W. S. Cummings**, trainmaster at La Junta, succeeds Mr. Baker, **V. Lienhard**, district engineer at La Junta succeeds Mr. Cummings, **J. W. Walter**, trainmaster at El Paso, succeeds Mr. Lienhard and **J. W. Murphy**, general yardmaster at Albuquerque, succeeds Mr. Walter. **H. B. Lautz**, general manager with headquarters at Amarillo, Texas, has been transferred to Topeka, Kan., to succeed **F. A. Lehman**, retired, and has been succeeded by **J. A. Gillies**, assistant general manager at Topeka. **P. O'Sullivan**, superintendent at Arkansas City, Kan., succeeds Mr. Gillies, **H. O. Wagner**, trainmaster at Wellington, succeeds Mr. O'Sullivan, **D. M. Rankin**, division engineer at Arkansas City, succeeds Mr. Wagner and **K. W. Claybaugh**, assistant roadmaster at Argentine, succeeds Mr. Rankin.

Frank A. Lehman, whose retirement on July 1 as general manager of the Eastern Lines of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., was announced in the *Railway Age* of June 24, was born at Mast Hope, Pa., on May 31, 1871, and entered railway service in 1888 as a night telegraph operator on the Santa Fe at Lorenzo, Ill. He later served consecutively as a train dispatcher and as a clerk in the general roadmaster's office, the trainmaster's office, the superintendent's office and the vice-president's office. In 1902 he was promoted to chief clerk to the vice-president in charge of operation and in 1907 he was advanced to superintendent of transportation. Two years later, Mr. Lehman was appointed assistant to the vice-president and in 1914 he tem-

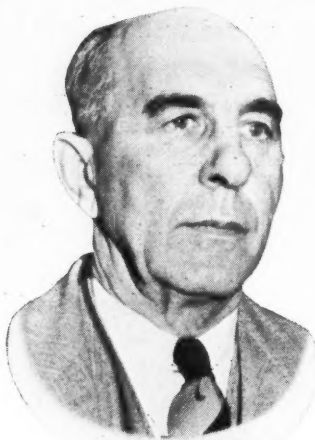


Frank A. Lehman

porarily became acting general superintendent at Newton, Kan. In 1921 he was promoted to general manager of the Western lines, with headquarters at Amarillo, Tex., and in 1927 he was transferred to Topeka as general manager of the Eastern

lines, holding that position until his retirement.

C. F. Donnatin, whose promotion to assistant general manager on the Southern Pacific, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of June 24, was born at Oakland, Cal., on March 22, 1879, and entered railway service in 1892 as a clerk in the Southern Pacific stores department at Los Angeles, Cal. He later served consecutively in station service as a telegraph operator, timekeeper, brakeman, switchman, conductor, yardmaster, trainmaster and assistant superintendent of the Los Angeles division at Los Angeles, Cal. Mr. Donnatin was promoted to superintendent of the San Joaquin division, with headquarters at Bakersfield, Cal., in November, 1921, and three years later he was transferred to the Salt Lake division, with headquarters at Ogden, Utah. On January 1, 1931, he was transferred to the Los Angeles division, with headquarters at Los



C. F. Donnatin

Angeles, Cal., the position he held until his recent promotion, which was effective July 1.

John R. Hitchcock, whose retirement on July 1 as general manager of the Coast lines of the Atchison, Topeka & Santa Fe, was announced in the *Railway Age* of June 24, was born at Woolwich, England, on July 6, 1873, and was educated in the public schools at Marshalltown, Iowa, and Oskaloosa. He entered railway service in 1890 as a messenger in the telegraph office of the Iowa Central (now the Minneapolis & St. Louis) and a year later went with the Santa Fe as a timekeeper in the mechanical department at San Marcial, N. M. In 1892, he went with the Atlantic & Pacific (now part of the Santa Fe) as a clerk and stenographer to the general master mechanic at Albuquerque, N. M., and later served as clerk and stenographer to the superintendent of transportation and the general superintendent. In 1897, he became a stenographer on the Coast Lines of the Santa Fe at Los Angeles, and was successively promoted to chief clerk and assistant to the general manager at that point. In February, 1905, he was advanced to division superintendent, with headquarters at San Bernardino, Cal., and in January, 1920, he was promoted to assistant

general manager, with headquarters at Los Angeles, Cal. Mr. Hitchcock was further advanced to acting general manager of



John R. Hitchcock

the Western lines, with headquarters at Amarillo, Tex., on November, 1928, and in January, 1929, he was appointed general manager of the Western lines and also vice-president of the Panhandle & Santa Fe. He was transferred to Los Angeles in 1932.

A. A. Lowe, assistant to the general manager of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to superintendent of the Tucson division, with headquarters at Tucson, Ariz., succeeding **William Wilson**, who retired on July 1, and **Donald J. Russell**, also an assistant to general manager, with headquarters at San Francisco, has been promoted to superintendent of the Los Angeles division, with headquarters at Los Angeles, Cal., replacing **C. F. Donnatin**, whose promotion to assistant general manager, with headquarters at San Francisco, was announced in the *Railway Age* of June 24. **L. P. Hopkins**, assistant division superintendent, with headquarters at San Francisco and **J. W. Corbett**, assistant division superintendent, with headquarters at Portland, Ore., have been promoted to assistants to the general manager at San Francisco, relieving Mr. Lowe and Mr. Russell. **G. H. Kilbourn**, trainmaster at Eugene, Ore., has been promoted to assistant superintendent at Portland, replacing Mr. Corbett and **E. C. Pearce**, trainmaster at Sacramento, Cal., has been promoted to assistant superintendent at San Francisco, succeeding Mr. Hopkins.

Mr. Lowe entered railway service as a fireman on the Oregon-Washington Railway and Navigation Company (now part of the Union Pacific system), later transferring to the accounting department. In 1912, he went with the Southern Pacific as chief clerk to the district engineer at Portland, Ore., and in 1922 he was made trainmaster of the Salt Lake division, later being transferred to the Western and Coast divisions. Mr. Lowe was appointed general transportation inspector in 1928, and in 1931 he was promoted to assistant superintendent of the Coast division. A year later he was appointed supervisor of

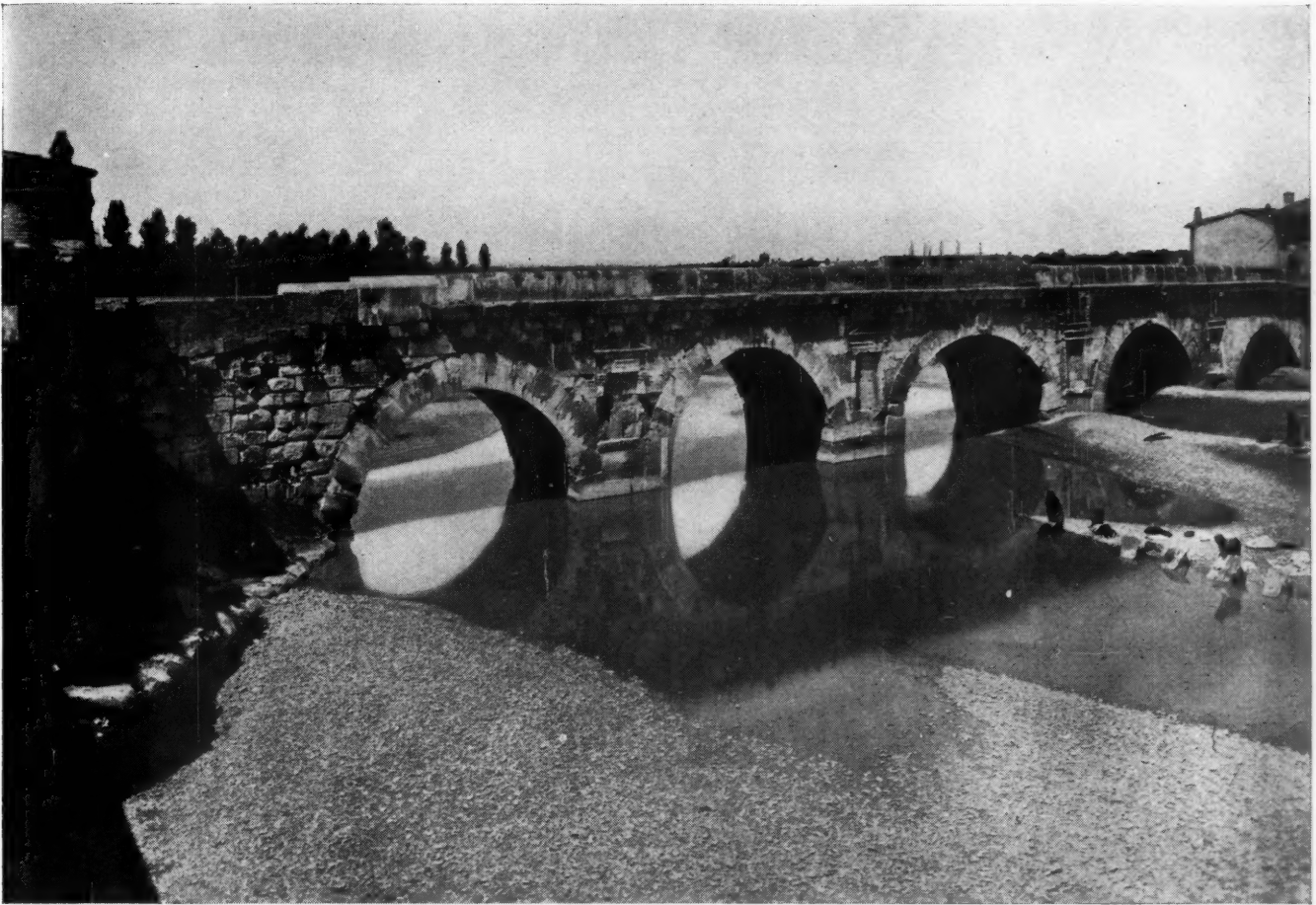


Photo by Fratelli Alinari—from "Bridges" by Charles S. Whitney—Published 1929 by William E. Rud

PONS AUGUSTUS RIMINI ITALY

This bridge, built at Rimini about 20 B.C., is one of the most beautiful of the Roman works. Composed of five semi-circular arches of white Istrian stone, it has been greatly admired and often copied, the motif over the piers appearing in important bridges in London and Paris. * * * Palladio, the famous Italian architect of the 16th century said of it: "But seeing of all the bridges that I have observed, that (Pons Augustus) appears to me to be the finest and the most worthy of consideration . . ."

* * * * *

The Security Sectional Arch, too, is ". . . Worthy of consideration . . ." Its design, while basically the same today as it was when it was introduced by the American Arch Company 28 years ago, has been constantly developed with progress in locomotive design and is today an essential factor in economical operation of modern steam power.

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transportation and in 1937 he was advanced to assistant to the general manager. Mr. Russell began railway service in



A. A. Lowe

1920 as an assistant foreman of an extra gang on the Sacramento division of the Southern Pacific, and later became a section foreman, instrumentman and assistant engineer in the maintenance of way department and on construction work. In 1927 he was appointed roadmaster on the Portland division, with headquarters at Oakridge, Ore., and in 1928 he was promoted to assistant trainmaster. A year later Mr. Russell was advanced to trainmaster and in August, 1934, he was promoted to assistant superintendent of the Portland division, with headquarters at Portland. In September, 1937, he was advanced to assistant to the general manager, with headquarters at San Francisco.

Mr. Wilson was born at Richview, Ill., on January 10, 1871, and entered railway service in 1889 as a telegraph operator and agent on the Chicago & Alton (now the Alton). During the next four years he served consecutively as telegraph operator



Donald J. Russell

and cashier on the Illinois Central, agent and operator on the St. Louis Southwestern, dispatcher on the Mexican Central (now the National Railways of Mexico), dispatcher on the Atchison, Topeka & Santa Fe and dispatcher on the Illinois Central. In 1903, he returned to the Santa Fe as a dispatcher, later being promoted to chief dispatcher, and in 1907 he

went with the Southern Pacific as a dispatcher. Mr. Wilson was promoted to chief dispatcher in 1908, and in 1915 he was advanced to trainmaster. The following year he was promoted to assistant superintendent and in 1918 he was advanced to superintendent, with headquarters at Tucson, the position he held at the time of his retirement.

TRAFFIC

G. H. Rehm, assistant general freight agent on the Colorado & Southern at Denver, Colo., has been promoted to general freight agent, with the same headquarters, a newly created position.

J. W. Tumlin, commercial agent on the Virginian, with headquarters at Cincinnati, Ohio, has been appointed general agent, Detroit agency, with headquarters at Detroit, Mich.

Carl F. Dahnke, district passenger agent of the Chicago, Milwaukee, St. Paul & Pacific at Madison, Wis., has been appointed general agent, passenger department at Milwaukee, Wis., to succeed **John C. Prien**, deceased, and has been succeeded by **Marshall L. Olson**, city passenger agent at Chicago.

E. C. Maegly, assistant general freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has retired and has been succeeded by **C. E. Hattel**, assistant general freight agent at Chicago, who in turn has been succeeded by **G. J. Steinmuller**, assistant chief clerk, traffic department, at Chicago.

Harvey E. Lounsbury, general freight agent on the Union Pacific, with headquarters at Portland, Ore., has been promoted to assistant traffic manager of the Northwestern district, with the same headquarters, succeeding **Albert Sidney Edmonds**, whose death on June 10 was announced in the *Railway Age* of June 17. **Tom J. Dowd**, assistant general freight agent at Portland, has been advanced to general freight agent at that point, replacing Mr. Lounsbury, and **George Shade**, chief clerk in the traffic department at Portland, has been promoted to assistant general freight agent, relieving Mr. Dowd.

C. Gordon Pennington, assistant general passenger agent on the Pennsylvania, with headquarters at Chicago, has been promoted to general passenger agent, with headquarters at Washington, D. C., succeeding **Alan B. Smith**, who has been transferred to Pittsburgh, Pa. Mr. Smith replaces **Raymond M. Flocker**, whose death on June 2 was announced in the *Railway Age* of June 10. **Ellsworth M. Holt**, assistant general passenger agent at Philadelphia, Pa., has been transferred to Chicago, relieving Mr. Pennington and **Earl R. Comer**, assistant general passenger agent of the Long Island at New York, has been transferred to Philadelphia succeeding Mr. Holt. **Homes Bannard**, division passenger agent on the Pennsylvania, at Indianapolis, Ind., has been promoted to assistant general passenger agent of the Long Island at New York, relieving Mr. Comer and **Irwin W. Adelhelm**, di-

vision passenger agent at Cleveland, Ohio, has been transferred to Indianapolis, replacing Mr. Bannard. **Austin C. Sigelen**, district passenger agent at Minneapolis, Minn., has been advanced to division passenger agent at Cleveland, succeeding Mr. Adelhelm.

William J. Leahy, passenger traffic manager of the Chicago, Rock Island & Pacific, will retire on July 1 after 56 years' railroad service, of which 52 have been with the Rock Island. Mr. Leahy was born on July 25, 1867, at Elmira, N. Y., and entered railway service in 1883 as a clerk in the auditor's office of the Buffalo, New York & Philadelphia (now part of the Pennsylvania) at Buffalo, N. Y. In the following year he went with the West Shore (now part of the New York Central) where he served in various positions in the passenger department until



William J. Leahy

1887, when he entered the service of the Rock Island as traveling passenger agent. Four years later he was made passenger agent at Philadelphia, Pa., and in 1899 he was appointed general eastern passenger agent at New York. In 1901, Mr. Leahy was advanced to assistant general passenger agent of the Rock Island and the St. Louis, Kansas City & Colorado (controlled by the Rock Island), with headquarters at St. Louis, Mo., being advanced to first assistant general passenger agent on these lines in 1905, with headquarters at Chicago. In 1909 he was further advanced to general passenger agent of the Rock Island, which position he held until 1920, when he was made assistant passenger traffic manager. His appointment as passenger traffic manager became effective on June 1, 1936.

George B. Hanson, district passenger agent on the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to general passenger agent, with headquarters at Los Angeles, Cal., succeeding **Henry P. Monahan**, whose death on June 15 is announced elsewhere in these columns.

Mr. Hanson was born in San Francisco in 1892 and entered the service of the Southern Pacific on June 1, 1907. After holding various positions in the general passenger office in San Francisco, he be-

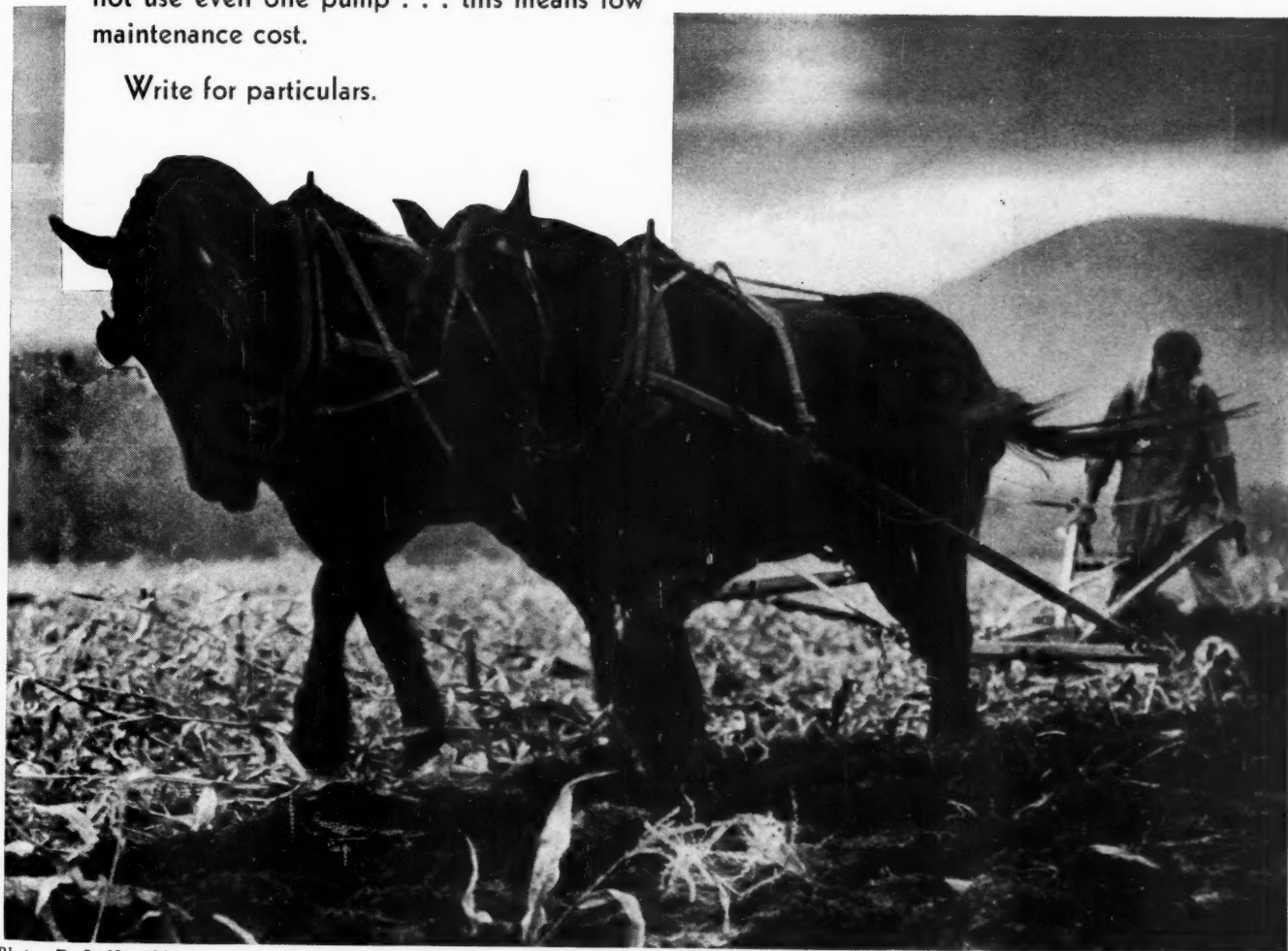
(Continued on page 60)

Boiler Horsepower from Exhaust Steam

Steam exhausted up the locomotive stack contains latent power . . . power that can help to turn the driving wheels. A substantial part of this latent power can be reclaimed and returned to the boiler by the Elesco exhaust steam injector.

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Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of April.

Region, road, and year	Miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Number of road locomotives on line			Per cent un-service-able	
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross, excluding locomotives and tenders	Net, revenue and non-revenue	Serviceable		Un-service-able		
									Not stored	Stored			
New England Region:													
Boston & Albany	1939	374	128,542	132,727	9,357	2,774	64.5	155,756	51,710	58	3	29	32.2
1938	374	109,528	114,248	8,274	2,512	64.1	142,551	46,508	56	7	27	30.0	
Boston & Maine	1939	1,917	259,099	287,686	22,676	9,269	67.9	524,483	190,394	113	5	99	45.6
1938	1,941	245,083	268,443	20,743	8,232	67.3	462,042	161,442	117	6	129	51.2	
N. Y., New Hav. & Hartf.	1939	1,858	339,908	428,185	26,328	12,225	65.4	668,407	235,951	169	1	97	35.2
1938	1,975	298,285	376,391	21,674	9,955	64.0	551,226	190,872	162	25	84	30.3	
Great Lakes Region:													
Delaware & Hudson	1939	830	213,157	280,594	30,348	7,264	64.3	447,649	207,695	120	50	86	33.6
1938	830	179,706	238,831	23,302	6,159	63.7	377,662	170,474	101	135	31	11.6	
Del., Lack. & Western	1939	983	358,953	410,267	63,712	12,565	65.4	762,239	307,311	132	2	79	37.1
1938	983	307,472	342,487	47,938	10,441	66.3	609,674	229,881	126	10	87	39.0	
Erie (incl. Chi. & Erie)	1939	2,290	581,332	613,893	34,863	25,811	67.2	1,491,736	551,876	191	48	231	49.1
1938	2,275	545,304	574,264	34,355	23,063	65.7	1,365,707	487,543	197	52	220	46.9	
Grand Trunk Western	1939	1,023	228,847	229,698	1,247	6,296	61.3	383,973	125,499	67	1	43	38.7
1938	1,027	221,837	223,173	1,588	5,547	61.3	337,433	110,911	69	2	51	41.8	
Lehigh Valley	1939	1,266	303,144	334,946	52,924	12,537	65.3	790,067	339,692	118	..	109	48.0
1938	1,288	274,168	299,488	38,965	10,331	63.8	646,339	258,605	121	3	139	52.9	
New York Central	1939	10,613	2,262,407	2,349,413	114,491	72,787	59.9	4,613,379	1,714,790	722	258	480	32.9
1938	10,653	2,209,506	2,327,528	120,996	70,109	59.0	4,580,813	1,740,252	749	312	421	28.4	
N. Y., Chicago & St. Louis	1939	1,672	449,465	455,915	5,418	16,431	54.4	961,511	338,711	143	15	40	20.2
1938	1,672	427,324	431,224	5,030	14,512	62.0	873,080	302,778	129	38	31	15.7	
Pere Marquette	1939	2,081	322,701	330,467	6,656	8,117	61.3	509,080	180,521	104	6	34	32.9
1938	2,081	275,374	284,017	5,823	7,170	59.8	454,904	159,406	93	33	41	24.6	
Pittsburgh & Lake Erie	1939	233	35,368	36,376	..	1,277	63.1	89,300	43,319	17	15	39	54.9
1938	233	44,814	45,670	..	1,767	60.1	141,296	74,670	24	16	31	43.7	
Wabash	1939	2,397	535,012	546,761	11,287	16,721	63.8	993,270	337,529	134	7	134	48.7
1938	2,421	491,035	499,950	10,171	14,718	63.6	863,394	286,490	130	23	138	47.4	
Central Eastern Region:													
Baltimore & Ohio	1939	6,279	1,164,614	1,427,270	144,971	36,421	65.4	2,280,347	944,919	575	180	488	39.3
1938	6,322	1,155,286	1,403,783	149,719	34,794	61.6	2,315,670	979,151	560	163	541	42.8	
Central of New Jersey	1939	680	151,238	171,890	33,651	5,018	61.0	349,946	167,098	78	3	76	48.4
1938	678	133,346	151,048	30,145	4,188	59.1	293,292	133,719	75	4	76	49.0	
Chicago & Eastern Illinois	1939	927	161,378	161,378	2,686	4,052	63.9	256,878	103,845	55	2	37	39.4
1938	927	152,821	153,015	2,533	3,640	63.9	221,735	86,336	53	2	50	47.6	
Elgin, Joliet & Eastern	1939	390	92,664	93,799	1,271	2,258	59.2	171,213	80,688	58	1	22	27.2
1938	435	77,163	78,161	1,149	1,729	58.4	129,136	58,544	51	3	29	34.9	
Long Island	1939	379	27,429	28,428	17,468	279	50.4	21,797	8,442	34	3	11	22.9
1938	390	28,981	29,766	14,588	276	50.4	21,522	8,301	28	10	9	19.1	
Pennsylvania System	1939	9,998	2,354,623	2,873,430	321,860	88,761	60.6	5,814,155	2,303,058	1,081	189	1,053	45.3
1938	10,023	2,155,186	2,524,964	286,296	82,466	61.7	5,287,574	2,165,631	1,097	502	775	32.6	
Reading	1939	1,443	336,701	371,288	46,488	9,846	62.4	676,493	309,193	182	7	165	46.6
1938	1,445	326,635	362,021	43,209	9,252	59.8	666,550	307,633	177	37	126	37.1	
Pocahontas Region:													
Chesapeake & Ohio	1939	3,057	507,759	519,776	14,225	16,604	61.2	1,122,034	514,762	273	144	118	22.1
1938	3,050	651,913	678,928	27,205	26,677	57.2	2,143,148	1,128,846	317	106	126	23.0	
Norfolk & Western	1939	2,169	392,398	405,389	20,392	13,840	66.7	867,007	377,450	194	136	27	7.6
1938	2,178	502,014	518,662	24,672	18,909	60.5	1,435,904	725,228	263	76	32	8.6	
Southern Region:													
Atlantic Coast Line	1939	5,081	692,627	700,136	9,824	15,067	58.6	894,137	284,512	264	10	102	27.1
1938	5,079	652,486	666,372	8,902	15,651	56.7	888,575	276,939	253	16	86	24.2	
Central of Georgia	1939	1,838	243,940	247,935	3,208	5,302	71.7	292,821	110,562	94	..	28	23.0
1938	1,886	233,075	236,631	3,128	4,777	67.9	274,371	100,565	92	..	29	24.0	
Illinois Central (incl. Y. & M. V.)	1939	6,537	1,301,477	1,307,608	24,643	34,806	59.9	2,311,229	929,790	588	35	224	26.4
1938	6,541	1,212,938	1,219,257	21,970	30,656	59.3	1,978,020	746,116	638	24	197	22.9	
Louisville & Nashville	1939	4,899	854,651	892,833	18,116	18,402	61.7	1,165,944	476,189	299	49	201	36.6
1938	4,929	953,154	1,015,451	23,359	21,209	58.8	1,453,387	622,009	316	41	191	34.9	
Seaboard Air Line	1939	4,305	578,890	601,724	5,236	14,602	62.2	861,249	292,005	240	3	59	19.5
1938	4,305	560,672	585,688	3,397	14,580	58.7	900,999	288,078	238	19	49	16.0	
Southern	1939	6,532	1,168,580	1,184,925	18,332	27,402	66.6	1,539,832	580,249	472	4	185	28.0
1938	6,570	1,140,134	1,159,106	18,206	25,416	64.2	1,490,863	570,598	497	2	237	32.2	
Northwestern Region:													
Chicago & North Western	1939	8,370	755,359	778,583	18,853	22,034	63.8	1,348,147	494,765	289	122	266	39.3
1938	8,388	723,924	743,942	15,874	19,857	65.3	1,187,160	436,898	304	200	200	28.4	
Chicago Great Western	1939	1,450	246,474	246,819	4,606	7,047	61.5	439,812	153,047	64	3	20	23.0
1938	1,450	228,686	228,736	6,998	6,202	58.7	386,910	130,894	63	2	24	27.0	
Chi., Milw., St. P. & Pac.	1939	10,934	1,133,585	1,166,680	38,873	32,089	63.1	2,030,989	813,805	401	107	157	23.6
1938	10,953	1,077,263	1,109,893	35,895	27,415	60.5	1,760,942	677,310	416	138	134	19.5	
Chi., St. P., Minneap. & Om.	1939	1,619	188,268	195,770	8,226	4,289	65.8	256,613	95,190	95	24	18	13.1
1938	1,636	186,134	190,752	7,012	3,987	67.5	239,534	97,418	104	19	15	10.9	
Great Northern	1939	7,976	669,068	662,369	25,860	22,909	65.1	1,467,975	599,059	330	63	151	27.8
1938	7,975	615,136	603,318	19,239	17,865	64.8	1,111,289	436,186	280	107	162	29.5	
Minneap., St. P. & S. St. M.	1939	4,266	350,471	354,586	3,838	8,026	65.9	463,134	179,566	119	1	28	18.9
1938	4,273	346,053	349,082	2,296	7,168	63.8	421,736	159,724	115	3	37	23.9	
Northern Pacific	1939	6,424	597,386	631,065	33,311	20,569	69.7	1,230,024	521,545	322	25	100	22.4
1938	6,423	538,668	558,385	25,545	16,490	67.2	992,230	402,092	281	82	91	20.0	
Central Western Region:													
Alton	1939	914	189,209	201,093	1,557	4,176	59.1	280,430	102,570	54	17	19	21.1
1938	912	184,394	188,231	855	3,629	56.3	244,911	84,972	78	9	10	10.3	
Atch., Top. & S. Fe. (incl. G. C. & S. F. & P. & S. F.) ..	1939	13,465	1,709,010	1,824,209	74,266	47,116	62.2	2,952,154	944,831	548	83	270	30.0
1938	13,512	1,562,947	1,667,751	66,243	41,062	61.9	2,580,494	819,976	567	86	270	29.3	
Chicago, Burl. & Quincy	1939	8,889	1,050,461	1,083,284	36,967	30,626	63.3	1, <					

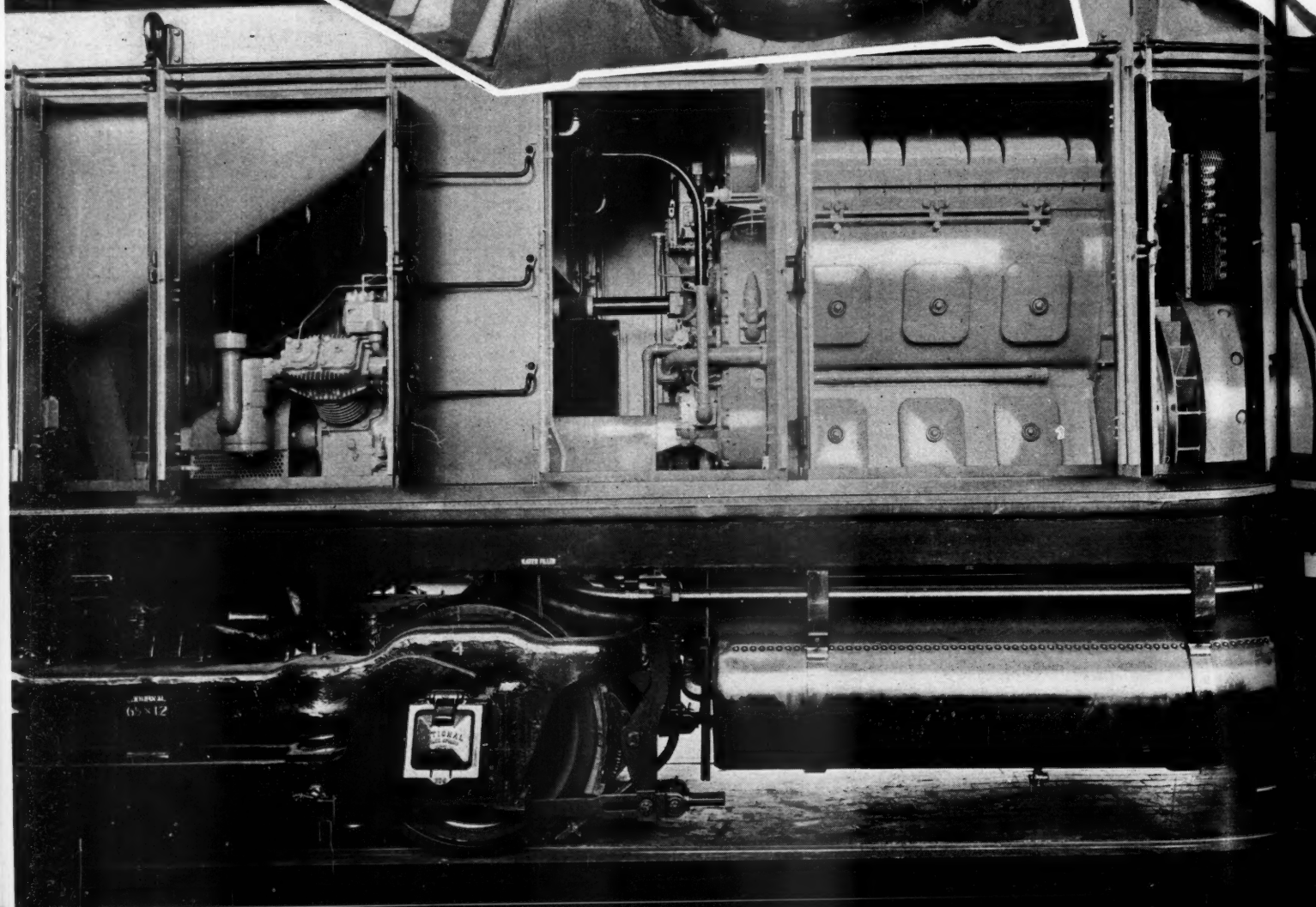
1939. Compared with April, 1938, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road, and year	Number of freight cars on line			Per cent un-serv-ice-able	Gross ton-miles per train-hour, excluding locomotives and tenders		Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Loco-motive-miles per locomotive-day	
	Home	Foreign	Total		Gross ton-miles per train-hour, excluding locomotives and tenders	Net ton-miles per train-mile								
New England Region:														
Boston & Albany	1939	1,065	3,919	4,984	2.6	19,776	1,232	409	18.6	336	27.9	4,609	166	56.4
1938		1,042	3,557	4,599	3.0	21,677	1,308	427	18.5	333	28.0	4,145	162	48.4
Boston & Maine	1939	6,505	7,553	14,058	8.5	28,148	2,029	736	20.5	445	31.9	3,311	98	50.6
1938		8,376	5,748	14,124	14.7	26,688	1,893	661	19.6	364	27.6	2,773	98	41.9
N. Y., New Hav. & Hartf.	1939	7,722	11,506	19,228	8.1	28,495	1,995	704	19.3	396	31.4	4,233	102	61.2
1938		11,042	8,320	19,362	16.6	27,625	1,878	650	19.2	320	26.1	3,221	101	53.6
Great Lakes Region:														
Delaware & Hudson	1939	6,795	3,610	10,405	6.0	31,904	2,112	980	28.6	624	33.9	8,341	116	43.8
1938		9,228	2,513	11,741	3.5	30,595	2,116	955	27.7	481	27.3	6,846	108	38.8
Del., Lack. & Western	1939	12,182	6,615	18,797	13.9	37,977	2,153	868	24.5	544	34.0	10,421	134	74.7
1938		14,436	4,502	18,938	15.8	33,715	2,010	758	22.0	393	26.9	7,795	133	63.9
Erie (incl. Chi. & Erie)	1939	16,538	11,670	28,208	6.2	44,264	2,587	957	21.4	647	45.0	8,033	100	50.9
1938		19,532	11,007	30,539	8.9	42,036	2,523	901	21.1	528	38.1	7,143	99	48.2
Grand Trunk Western	1939	4,799	5,124	9,923	14.5	34,348	1,684	550	19.9	424	34.7	4,089	93	75.4
1938		5,351	4,052	9,403	18.3	32,189	1,526	502	20.0	387	31.6	3,600	99	67.2
Lehigh Valley	1939	10,123	9,280	19,403	2.0	47,230	2,640	1,135	27.1	585	33.1	8,944	107	60.1
1938		11,945	6,588	18,533	12.2	43,437	2,379	952	25.0	457	28.6	6,693	111	46.2
New York Central	1939	91,042	51,090	142,132	19.0	36,073	2,056	764	23.6	393	27.9	5,386	107	63.4
1938		102,717	50,616	153,333	18.0	36,124	2,088	793	24.8	382	26.1	5,445	105	62.0
N. Y., Chicago & St. Louis	1939	7,245	6,805	14,050	5.0	41,384	2,142	755	20.6	497	60.0	6,753	90	83.2
1938		8,170	5,804	13,974	5.0	39,558	2,045	709	20.9	712	55.0	6,036	89	78.8
Pere Marquette	1939	9,592	5,509	15,101	3.9	28,418	1,583	561	22.2	391	28.7	2,892	102	76.0
1938		10,933	4,841	15,774	4.7	27,674	1,653	579	22.2	334	25.1	2,553	95	64.5
Pittsburgh & Lake Erie	1939	9,690	8,172	17,862	33.5	32,807	2,525	1,225	33.9	82	3.8	6,197	120	19.0
1938		8,096	7,777	15,873	35.7	43,840	3,153	1,666	42.3	156	6.1	10,682	96	23.7
Wabash	1939	12,919	8,005	20,924	11.9	39,401	1,871	636	20.2	532	41.3	4,694	117	70.9
1938		14,175	7,131	21,306	7.8	37,032	1,772	588	19.5	453	36.6	3,945	113	61.6
Central Eastern Region:														
Baltimore & Ohio	1939	58,860	20,156	79,016	19.1	28,993	1,984	822	25.9	396	23.4	5,016	144	45.5
1938		65,205	19,227	84,432	16.6	28,173	2,026	857	28.1	387	22.3	5,163	140	43.9
Central of New Jersey	1939	9,768	10,403	20,171	30.5	28,635	2,439	1,164	33.3	273	13.4	8,191	134	56.9
1938		10,786	7,889	18,675	33.9	27,869	2,326	1,061	31.9	232	12.3	6,574	132	50.0
Chicago & Eastern Illinois	1939	3,299	3,174	6,473	2.8	28,996	1,600	647	25.6	542	33.1	3,734	130	61.7
1938		3,422	2,628	6,050	4.3	27,409	1,455	567	23.7	473	31.2	3,104	127	51.8
Elgin, Joliet & Eastern	1939	8,471	3,160	11,631	6.9	18,076	1,899	895	35.7	229	10.8	6,896	121	54.0
1938		8,792	1,906	10,698	11.7	16,274	1,722	781	33.9	182	9.2	4,486	129	44.4
Long Island	1939	288	3,198	3,486	5.2	5,679	822	318	30.3	80	5.2	742	345	47.2
1938		370	2,249	2,619	4.0	5,748	772	298	30.1	92	6.1	709	308	44.0
Pennsylvania System	1939	201,458	47,047	248,505	22.1	38,835	2,511	995	25.9	310	19.7	7,678	118	50.5
1938		208,053	42,970	251,023	17.2	37,221	2,488	1,019	26.2	287	17.8	7,202	118	44.5
Reading	1939	25,344	9,317	34,661	25.9	24,098	2,020	923	31.4	291	14.8	7,142	148	43.7
1938		28,300	8,538	36,838	16.6	26,055	2,047	945	33.3	281	14.1	7,096	137	43.5
Pocahontas Region:														
Chesapeake & Ohio	1939	53,172	9,077	62,249	2.6	38,464	2,230	1,023	31.0	281	14.8	5,613	98	35.9
1938		50,934	10,308	61,242	3.1	50,631	3,313	1,745	42.3	617	25.5	12,337	79	47.0
Norfolk & Western	1939	45,594	4,283	49,877	3.8	38,343	2,233	972	27.3	276	15.2	5,801	121	42.8
1938		41,622	4,198	45,820	1.6	45,079	2,897	1,463	38.4	536	23.1	11,099	108	53.8
Southern Region:														
Atlantic Coast Line	1939	16,145	8,209	24,354	20.6	23,766	1,294	412	18.9	382	34.5	1,867	109	69.0
1938		18,352	7,933	26,285	19.2	23,948	1,364	425	17.7	343	34.2	1,818	110	68.4
Central of Georgia	1939	4,881	2,690	7,571	2.3	23,678	1,205	455	20.9	470	31.4	2,005	120	74.7
1938		5,534	2,221	7,755	2.0	22,575	1,182	433	21.1	425	29.7	1,777	116	72.3
Illinois Central (incl. Y. & M. V.)	1939	27,100	15,116	42,216	3.2	29,975	1,794	722	26.7	712	44.5	4,741	135	56.4
1938		37,389	15,549	52,938	14.5	26,857	1,638	618	24.3	476	33.0	3,802	137	51.8
Louisville & Nashville	1939	43,783	8,335	52,118	17.4	23,101	1,366	558	25.9	312	19.5	3,240	159	59.2
1938		42,861	8,189	51,050	13.6	24,393	1,526	653	29.3	405	23.5	4,206	128	66.7
Seaboard Air Line	1939	11,736	5,414	17,150	4.4	26,379	1,514	513	20.0	563	45.3	2,261	118	74.3
1938		12,094	5,450	17,544	2.6	27,367	1,633	522	19.8	559	48.2	2,231	111	70.5
Southern	1939	23,242	16,560	39,802	10.7	23,599	1,324	499	21.2	487	34.5	2,961	137	63.7
1938		21,162	17,020	38,182	10.2	22,625	1,314	503	22.5	502	34.8	2,895	141	56.1
Northwestern Region:														
Chicago & North Western	1939	37,367	16,179	53,546	8.7	29,788	1,827	671	22.5	304	21.2	1,970	119	42.7
1938		40,528	15,373	55,901	7.3	27,781	1,691	622	22.0	261	18.2	1,736	120	39.9
Chicago Great Western	1939	2,263	2,915	5,178	1.5	33,083	1,786	622	21.7	976	73.1	3,518	128	100.6
1938		2,715	2,655	5,370	3.1	31,130	1,698	574	21.1	794	64.1	3,009	130	92.4
Chi., Milw., St. P. & Pac.	1939	44,456	15,539	59,995	2.7	29,608	1,798	721	25.4	448	28.0	2,481	120	65.7
1938		48,014	13,094	61,108	2.5	27,394	1,644	632	24.7	366	24.5	2,061	122	60.3
Chi., St. P., Minneap. & Om.	1939	4,139	4,355	8,494	8.8	19,143	1,370	508	22.2	355	24.3	1,960	117	53.6
1938		4,457	4,675	9,132	7.8	17,948	1,297	527	24.4	353	21.4	1,985	118	51.6
Great Northern	1939	37,447	8,254	45,701	8.7	32,846	2,207	900	26.1	434	25.5	2,504	115	46.8
1938		38,904	7,496	46,400	7.7	27,948	1,814	712	24.4	308	19.5	1,823	127	41.8
Minneap., St. P. & S. St. M.	1939	12,701	3,327	16,028	5.3	22,639	1,328	515	22.4	368	25.0	1,403	104	84.3
1938		13,494	2,499	15,993	5.9	20,632	1,219	462	22.3	329	23.1	1,246	105	76.4
Northern Pacific	1939	31,160	4,780	35,940	11.1	32,546	2,067	876	25.4	481	27.2	2,706	135	53.9
1938		32,961	3,797	36,758	10.8	29,629	1,847	748	24.4	368	22.4	2,087	144	47.0
Central Western Region:														
Alton	1939	1,801	5,813	7,614	12.4	35,484	1,494	547	24.6	455	31.4	3,741	129	80.0
1938		2,653	5,274	7,927	14.5	32,212	1,333	462	23.4	339	25.7	3,106	130	68.1
Atch., Top. & S. Fe (incl. G. C. & S. F. & P. & S. F.) ..	1939	75,141	10,687	85,828	10.7	34,803	1,734,							



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THE GM Diesel, which consistently has been setting up new high records for fuel economies, low operating and maintenance costs with high availability, is a compact and rugged uniflow two-cycle solid-injection engine.

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ELECTRO-MOTIVE CORPORATION
SUBSIDIARY OF GENERAL MOTORS LA GRANGE, ILLINOIS, U. S. A.

Railway Officers

(Continued from page 57)

came secretary to the passenger traffic manager on May 1, 1912. He was later promoted to chief clerk and also to chief



George B. Hanson

solicitation clerk in that office. In 1924, he was appointed city passenger agent at San Francisco and two years later was promoted to district passenger agent at San Jose, Cal. Mr. Hanson returned to San Francisco as district passenger agent on July 1, 1932, and since then has had charge of solicitation work in that city and on the peninsula as far south as Palo Alto, Cal.

J. E. Davis, assistant to the vice-president in charge of traffic of the Union Pacific, with headquarters at Omaha, Neb., has been promoted to assistant freight traffic manager, with the same headquarters, and **Kenneth G. Carlson**, who on May 16, was advanced to general freight agent, with headquarters at Denver, Colo., has been promoted to assistant to the vice-president at Omaha, succeeding Mr. Davis. **Joseph C. Beaumont**, assistant general freight agent at Omaha, has been advanced to general freight agent at Denver, replacing Mr. Carlson. A biographical sketch of Mr. Carlson's railway career, accompanied by a photograph, appeared in the *Railway Age* of June 17, following his promotion to general freight agent at Denver.

ENGINEERING AND SIGNALING

W. D. Rhoads, supervisor of bridges and buildings of the Macon division of the Central of Georgia, has been promoted to division engineer at Macon, Ga., succeeding **W. R. Golsan**, who has voluntarily retired due to ill health, after more than 43 years of service.

B. Wheelwright, engineer maintenance of way, Central region, Canadian National, with headquarters at Toronto, Ont., has been appointed chief engineer of the Central region, with the same headquarters, succeeding **T. T. Irving**, who has retired after many years of service. **J. P. Menard**, division engineer, at Quebec, Que., has been appointed district engineer of the Quebec district, with the same headquar-

ters, succeeding **L. Brousseau**, who has been appointed engineer maintenance of way, Central region, with headquarters at Toronto, Ont.

P. O. Ferris, engineer maintenance of way of the Delaware & Hudson, with headquarters at Albany, N. Y., has been appointed chief engineer, to succeed **James MacMartin**, who has retired at his own request, effective July 1. The position of engineer maintenance of way has been abolished, for the present, and all work formerly under the jurisdiction of the engineer maintenance of way will be handled by the chief engineer. A photograph of Mr. Ferris and a biographical sketch of his railroad career were published in the *Railway Age* of February 11, in connection with his appointment as engineer maintenance of way.

F. T. Darrow, chief engineer of the Chicago, Burlington & Quincy, has been appointed also chief engineer of the Colorado & Southern, the Fort Worth & Denver City and the Wichita Valley, with headquarters as before at Chicago, succeeding **R. C. Gowdy**, whose death on June 10, was announced in the *Railway Age* of June 24, and **M. A. Stainer**, engineer of the Fort Worth & Denver City, with headquarters at Ft. Worth, Tex., has been promoted to assistant chief engineer of the Colorado & Southern, the Fort Worth & Denver City and the Wichita Valley, with headquarters at Denver, Colo., a newly-created position.

Forrest H. McKenney, whose promotion to district engineer of maintenance of way on the Chicago, Burlington & Quincy, with headquarters at Omaha, Neb., was announced in the *Railway Age* of June 3, was born at Malcolm, Neb., on August 10, 1896, and graduated in civil engineering from the University of Nebraska in 1920. He entered railway service on August 23, 1919, as a draftsman on the Burlington, later serving as an instrumentman on location surveys. On September 1, 1922, he was promoted to resident engineer on construction work on the Beardstown division and on June 1, 1925, he was appointed instrumentman in the engineering department of the general office at Chicago. Mr. Kenney was promoted to division engineer, with headquarters at Beardstown, Ill., on October 1, 1929, and on March 16, 1933, he was appointed division engineer and assistant master carpenter at Beardstown. He was appointed assistant engineer in charge of the rail detector car on August 16, 1934, the position he held until his recent promotion.

Wendale Arthur Gunderson, whose promotion to district maintenance engineer on the Chicago, Rock Island & Pacific, with headquarters at Kansas City, Mo., was announced in the *Railway Age* of May 6, was born at Nordness, Iowa, on October 18, 1902, and attended the State University of Iowa for three years. He entered railway service on June 7, 1917, between terms at school as a station helper at Montezuma, Iowa, serving in this capacity and as relief clerk during vacations from school until 1922. He returned to the Rock Island in November, 1925, as

a chainman at Cedar Rapids, Iowa, and on April 22, 1926, was promoted to instrumentman and later to levelman on location and construction work at Amarillo, Tex. In 1928 he was transferred to Jamesport, Mo., as instrumentman on location work on the Rock Island's Coburn-Birmingham line and on October 26, 1929, he was promoted to resident engineer at Jamesport, later being transferred to Trenton, Mo. On September 30, 1931, Mr. Gunderson was appointed track inspector, with headquarters at Fairbury, Neb., and on July 1, 1936, he was promoted to acting roadmaster at Fairbury, later returning to his position as track inspector. On August 1, 1937, he was promoted to roadmaster on the Oklahoma division, with headquarters at El Reno, Okla., and two months later he was transferred to Little Rock, Ark. Mr. Gunderson was transferred to Pratt, Kan., on October 7, 1938, where he was located at the time of his recent promotion.

MECHANICAL

J. P. Morris, mechanical superintendent of the Atchison, Topeka & Santa Fe, with headquarters at Fort Madison, Iowa, has been promoted to general assistant mechanical department, with headquarters at Chicago, and has been succeeded by **O. G. Pierson**, master mechanic at Arkansas City, who in turn has been succeeded by **James W. Atkinson**, general locomotive foreman at Argentine, Kan.

PURCHASES AND STORES

F. W. Holt, assistant purchasing agent of the Erie, has been appointed purchasing agent, with headquarters at Cleveland, Ohio, succeeding **F. E. Driscoll**, who has retired at his own request because of ill health, effective July 1, after 38 years of service.

OBITUARY

E. A. Schrank, master mechanic of the Chicago, Burlington & Quincy, with headquarters at Casper, Wyo., died on June 22 following an operation.

Henry P. Monahan, general passenger agent on the Southern Pacific, with headquarters at Los Angeles, Cal., died in that city on June 15, after an illness of several months.

John B. Kerr, former president of the New York, Ontario & Western, died of heart disease at his home in Wainscott, Long Island, N. Y., on June 25, after a month's illness. Mr. Kerr was 88 years old, having been born on February 1, 1851, at Newburgh, N. Y. After studying law in the office of E. A. Brewster, at Newburgh, he was admitted to the New York bar in 1872 and practiced law until 1881, when he became attorney for the New York, Ontario & Western. Mr. Kerr was elected a director of that road in 1883 and resigned in 1885, being re-elected a director in 1890. From 1892 to 1913 Mr. Kerr was vice-president and general counsel and in September, 1913, was elected president, in which capacity he served until his retirement in December, 1929.